ANOVA with binary variables - The F-test and some Alternatives

Appendix B 3
Tables and Graphs of the Type I Error Rate of selected methods for fixed n_i (5,10,..,50) in mixed designs

All tables refer to α=0.05 and α=0.01, graphs to α=0.05. Reported are the proportions of rejections of the corresponding null hypothesis.

Note: Type I error rates of the ATS method marked with "(uncorr.)" are based on uncorrected effects ab_{ij} of the interaction AB, whereas all other rates are corrected with regard to unequal cell frequencies in order to avoid impacts on the main effects.

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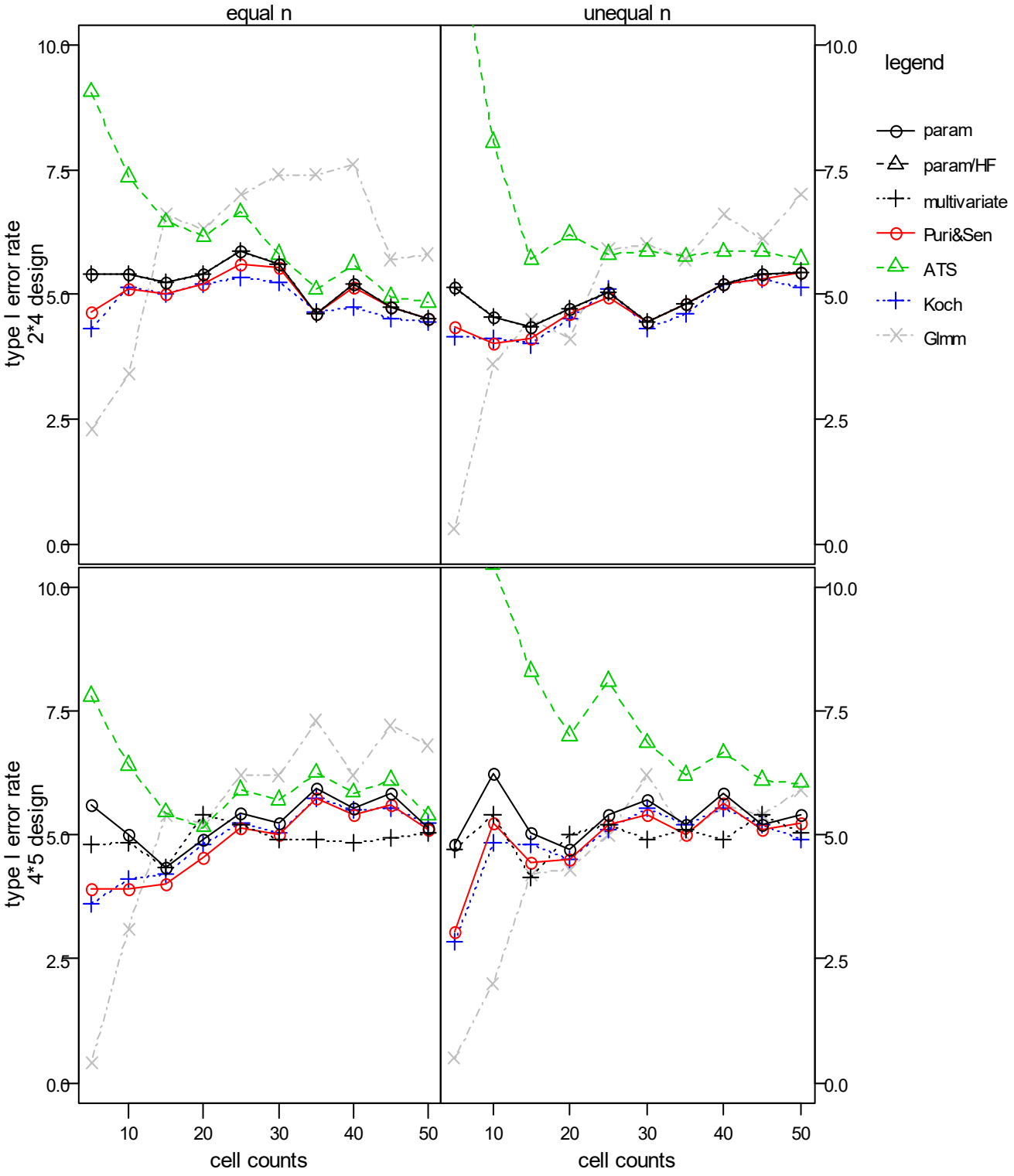
3. 1. Main effect A - null model

3. 1. 1. equal correlations on B (r=0.3)

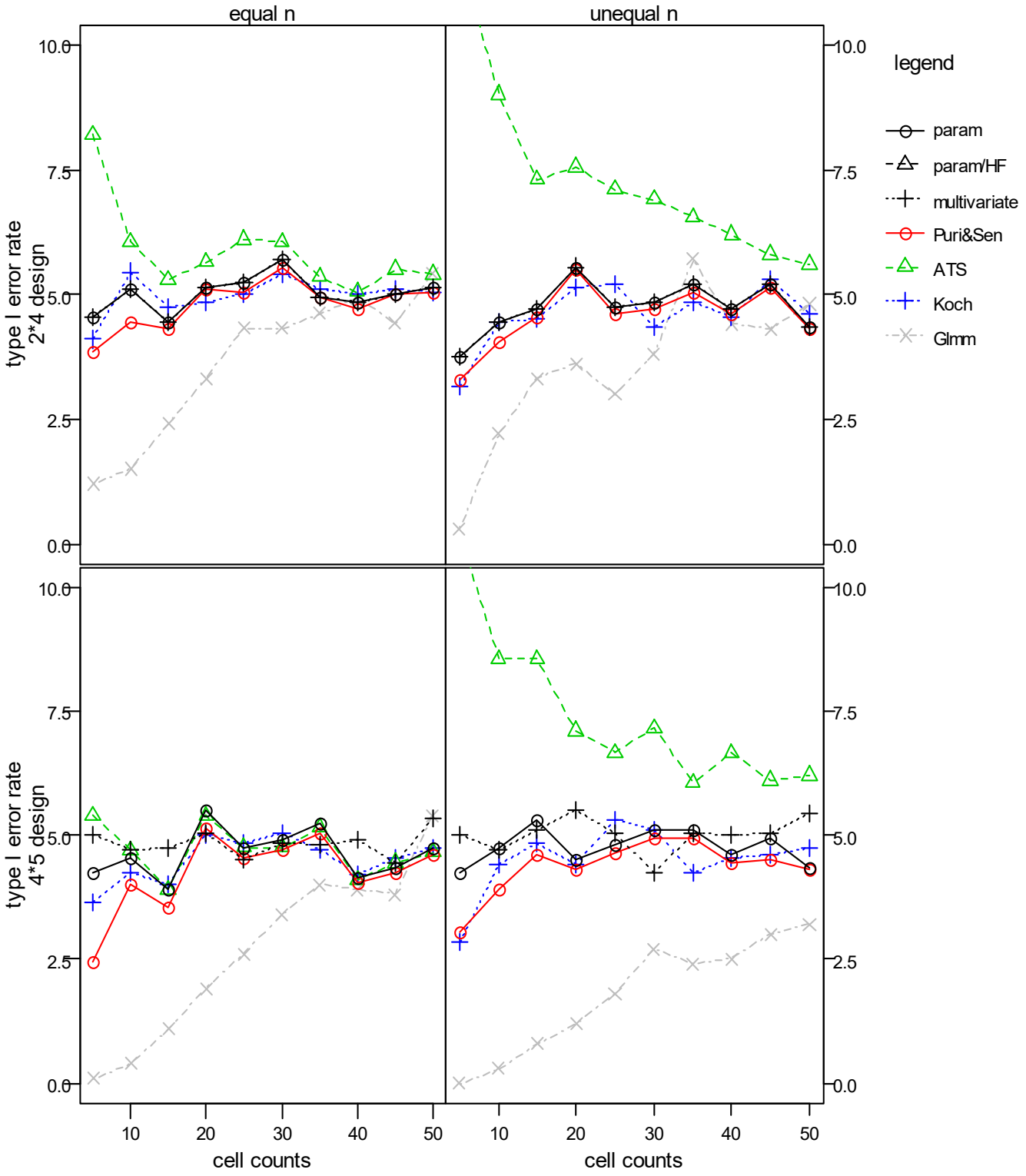
3. 1. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	5.40	5.40	5.25	5.40	5.60	5.20	4.50	5.15	4.55	4.35	4.7	4.45	5.20	5.45
	par./ HF-corr.														
	multivariate	5.40	5.40	5.25	5.40	5.60	5.20	4.50	5.15	4.55	4.35	4.7	4.45	5.20	5.45
	Puri & Sen	4.65	5.10	5.00	5.20	5.55	5.15	4.50	4.35	4.00	4.10	4.6	4.45	5.20	5.45
	ATS	9.05	7.35	6.45	6.15	5.80	5.60	4.85	12.50	8.05	5.70	6.2	5.85	5.85	5.70
	Koch	4.30	5.15	5.00	5.20	5.25	4.75	4.45	4.15	4.10	4.00	4.5	4.30	5.20	5.15
	GLMM	2.30	3.40	6.60	6.30	7.40	7.60	5.80	0.30	3.60	4.50	4.1	6.00	6.60	7.00
4*5	parametric	5.60	5.00	4.35	4.90	5.25	5.55	5.15	4.80	6.25	5.05	4.7	5.70	5.85	5.40
	par./ HF-corr.														
	multivariate	4.80	4.85	4.35	5.40	4.90	4.85	5.05	4.70	5.40	4.15	5.0	4.90	4.90	5.05
	Puri & Sen	3.90	3.90	4.00	4.55	5.00	5.40	5.10	3.05	5.25	4.45	4.5	5.40	5.65	5.25
	ATS	7.80	6.40	5.45	5.15	5.70	5.85	5.40	16.90	10.45	8.30	7.0	6.85	6.65	6.05
	Koch	3.60	4.10	4.20	4.80	5.05	5.50	5.25	2.85	4.85	4.80	4.5	5.55	5.55	4.90
	GLMM	0.40	3.10	5.40	5.20	6.20	6.20	6.80	0.50	2.00	4.20	4.3	6.20	5.60	5.90


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

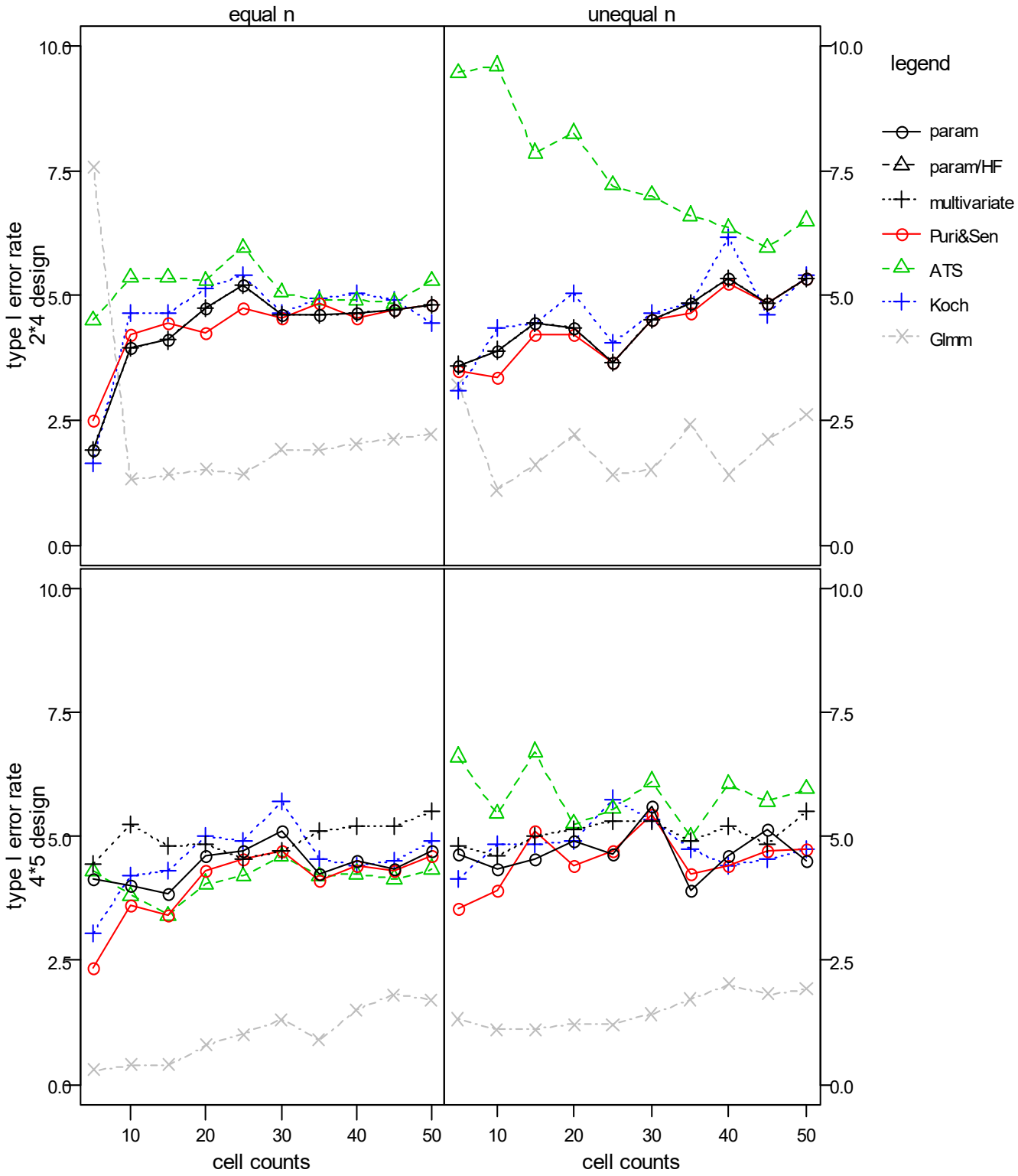
3. 1. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	4.55	5.10	4.45	5.15	5.70	4.85	5.15	3.75	4.45	4.70	5.55	4.85	4.70	4.35
	par./ HF-corr.														
	multivariate	4.55	5.10	4.45	5.15	5.70	4.85	5.15	3.75	4.45	4.70	5.55	4.85	4.70	4.35
	Puri & Sen	3.85	4.45	4.30	5.10	5.55	4.70	5.05	3.30	4.05	4.55	5.50	4.70	4.60	4.30
	ATS	8.20	6.05	5.30	5.65	6.05	5.05	5.40	11.85	9.00	7.30	7.55	6.90	6.20	5.60
	Koch	4.10	5.45	4.75	4.85	5.40	5.00	5.05	3.15	4.45	4.50	5.15	4.35	4.55	4.60
	GLMM	1.21	1.51	2.41	3.32	4.32	4.92	5.43	0.30	2.20	3.31	3.61	3.81	4.41	4.81
4*5	parametric	4.25	4.55	3.90	5.50	4.90	4.15	4.75	4.25	4.75	5.30	4.50	5.10	4.60	4.35
	par./ HF-corr.														
	multivariate	5.00	4.70	4.75	5.05	4.85	4.90	5.35	5.00	4.70	5.10	5.50	4.25	5.00	5.45
	Puri & Sen	2.45	4.00	3.55	5.15	4.70	4.05	4.60	3.05	3.90	4.60	4.30	4.95	4.45	4.30
	ATS	5.40	4.70	3.90	5.40	4.75	4.10	4.65	11.05	8.55	8.55	7.10	7.15	6.65	6.20
	Koch	3.65	4.25	4.00	5.00	5.05	4.20	4.75	2.85	4.40	4.85	4.40	5.10	4.55	4.75
	GLMM	0.10	0.40	1.10	1.90	3.40	3.90	5.40	0.00	0.30	0.80	1.20	2.70	2.50	3.20


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 1. 1. 3 p = 0.9

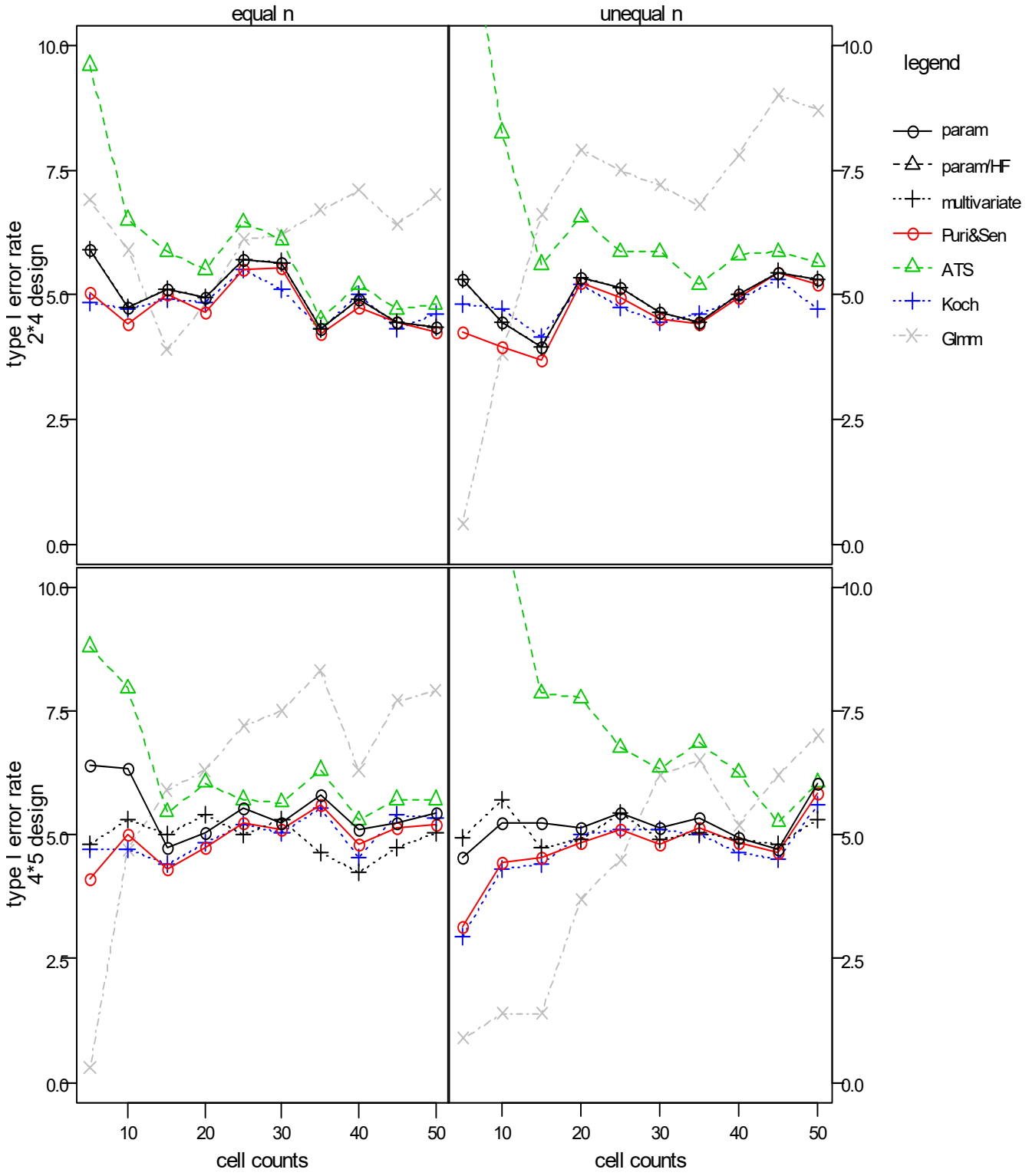
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	1.90	3.95	4.10	4.75	4.60	4.65	4.80	3.60	3.90	4.45	4.35	4.50	5.35	5.35
	par./ HF-corr.														
	multivariate	1.90	3.95	4.10	4.75	4.60	4.65	4.80	3.60	3.90	4.45	4.35	4.50	5.35	5.35
	Puri & Sen	2.50	4.20	4.45	4.25	4.55	4.55	4.80	3.50	3.35	4.20	4.20	4.50	5.25	5.35
	ATS	4.50	5.35	5.35	5.30	5.05	4.90	5.30	9.45	9.60	7.85	8.25	7.00	6.35	6.50
	Koch	1.65	4.65	4.65	5.15	4.65	5.05	4.45	3.10	4.35	4.45	5.05	4.65	6.15	5.40
	GLMM	7.57	1.31	1.41	1.51	1.92	2.02	2.22	3.21	1.10	1.61	2.21	1.51	1.41	2.61
4*5	parametric	4.15	4.00	3.85	4.60	5.10	4.50	4.70	4.65	4.35	4.55	4.90	5.60	4.60	4.50
	par./ HF-corr.														
	multivariate	4.45	5.25	4.80	4.85	4.70	5.20	5.50	4.80	4.60	5.00	5.15	5.30	5.20	5.50
	Puri & Sen	2.35	3.60	3.40	4.30	4.70	4.40	4.60	3.55	3.90	5.10	4.40	5.45	4.40	4.75
	ATS	4.30	3.80	3.40	4.05	4.60	4.25	4.35	6.60	5.45	6.70	5.25	6.10	6.05	5.95
	Koch	3.05	4.20	4.30	5.00	5.70	4.40	4.90	4.15	4.85	4.85	4.90	5.35	4.40	4.75
	GLMM	0.30	0.40	0.40	0.80	1.30	1.50	1.70	1.31	1.11	1.11	1.21	1.42	2.02	1.92


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 1. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

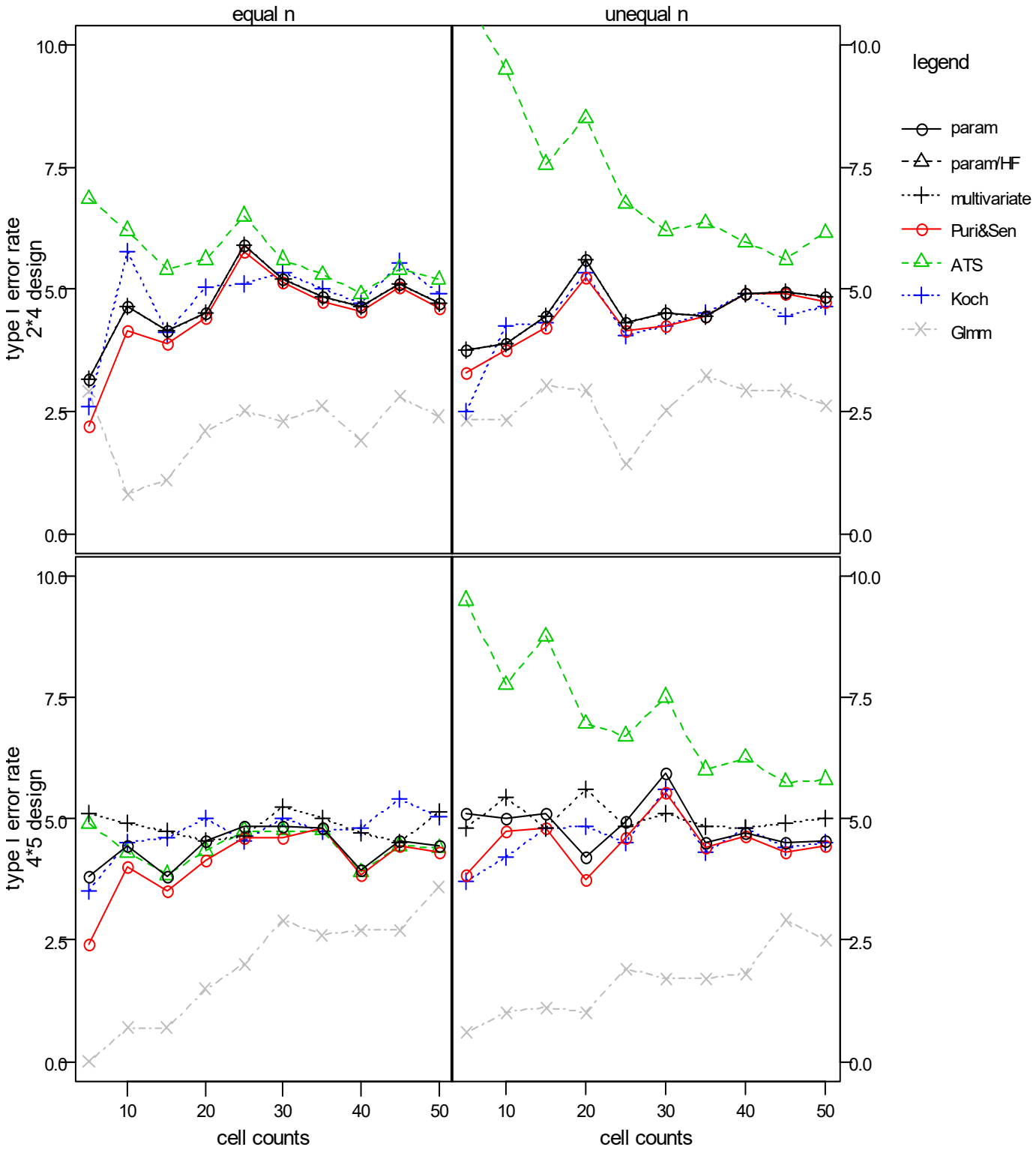
3. 1. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	5.90	4.75	5.10	4.95	5.65	4.90	4.35	5.30	4.45	3.95	5.35	4.65	5.00	5.30
	par./ HF-corr.														
	multivariate	5.90	4.75	5.10	4.95	5.65	4.90	4.35	5.30	4.45	3.95	5.35	4.65	5.00	5.30
	Puri & Sen	5.05	4.40	5.00	4.65	5.55	4.75	4.25	4.25	3.95	3.70	5.25	4.50	4.95	5.20
	ATS	9.60	6.50	5.85	5.50	6.10	5.20	4.80	13.70	8.25	5.60	6.55	5.85	5.80	5.65
	Koch	4.85	4.70	4.90	4.85	5.10	5.00	4.60	4.80	4.70	4.15	5.20	4.45	4.90	4.70
	GLMM	6.90	5.90	3.90	4.80	6.20	7.10	7.00	0.40	3.80	6.60	7.90	7.20	7.80	8.70
4*5	parametric	6.40	6.35	4.75	5.05	5.25	5.10	5.45	4.55	5.25	5.25	5.15	5.15	4.95	6.05
	par./ HF-corr.														
	multivariate	4.80	5.30	5.00	5.40	5.30	4.25	5.05	4.95	5.70	4.75	4.90	4.90	4.90	5.30
	Puri & Sen	4.10	5.00	4.30	4.75	5.10	4.80	5.20	3.15	4.45	4.55	4.85	4.80	4.85	5.85
	ATS	8.80	7.95	5.45	6.05	5.65	5.30	5.70	17.50	11.40	7.85	7.75	6.35	6.25	6.05
	Koch	4.70	4.70	4.40	4.85	5.05	4.55	5.35	2.95	4.30	4.40	5.00	5.10	4.65	5.60
	GLMM	0.30	4.70	5.90	6.30	7.50	6.30	7.90	0.90	1.40	1.40	3.70	6.20	5.20	7.00


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

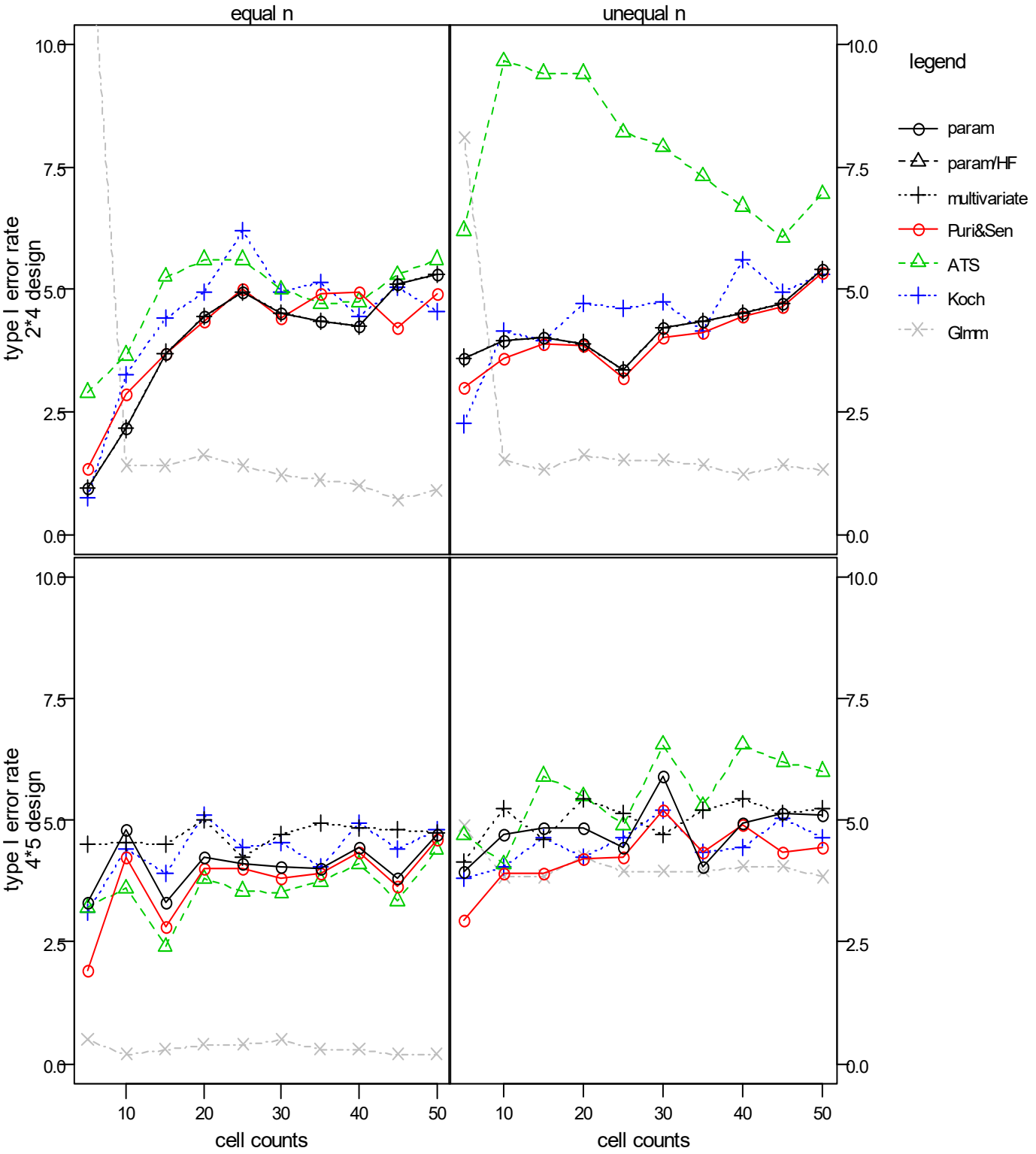
3. 1. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.15	4.65	4.15	4.50	5.20	4.65	4.70	3.75	3.90	4.45	5.60	4.50	4.90	4.85
	par./ HF-corr.														
	multivariate	3.15	4.65	4.15	4.50	5.20	4.65	4.70	3.75	3.90	4.45	5.60	4.50	4.90	4.85
	Puri & Sen	2.20	4.15	3.90	4.40	5.15	4.55	4.60	3.30	3.75	4.20	5.25	4.25	4.90	4.75
	ATS	6.85	6.20	5.40	5.60	5.60	4.90	5.20	11.00	9.50	7.55	8.50	6.20	5.95	6.15
	Koch	2.60	5.75	4.10	5.05	5.35	4.70	4.90	2.50	4.25	4.30	5.35	4.25	4.90	4.65
	GLMM	2.90	0.80	1.10	2.10	2.30	1.90	2.40	2.32	2.32	3.02	2.92	2.52	2.92	2.62
4*5	parametric	3.80	4.45	3.80	4.55	4.85	3.95	4.45	5.10	5.00	5.10	4.20	5.95	4.70	4.55
	par./ HF-corr.														
	multivariate	5.10	4.90	4.75	4.55	5.25	4.70	5.15	4.80	5.45	4.80	5.60	5.10	4.80	5.00
	Puri & Sen	2.40	4.00	3.50	4.15	4.60	3.85	4.30	3.85	4.75	4.80	3.75	5.55	4.65	4.45
	ATS	4.90	4.30	3.85	4.35	4.75	3.90	4.40	9.50	7.75	8.75	6.95	7.50	6.25	5.80
	Koch	3.50	4.50	4.60	5.00	5.00	4.80	5.05	3.70	4.20	4.80	4.85	5.60	4.80	4.50
	GLMM	0.00	0.70	0.70	1.50	2.90	2.70	3.60	0.60	1.00	1.10	1.00	1.71	1.81	2.51


equal n
unequal n
type I error rate
2*4 design
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm
0.0
2.5
5.0
7.5
10.0
10
20
30
40
50

3. 1. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	0.95	2.15	3.70	4.45	4.50	4.25	5.30	3.60	3.95	4.00	3.90	4.20	4.50	5.40
	par./ HF-corr.														
	multivariate	0.95	2.15	3.70	4.45	4.50	4.25	5.30	3.60	3.95	4.00	3.90	4.20	4.50	5.40
	Puri & Sen	1.35	2.85	3.70	4.35	4.40	4.95	4.90	3.00	3.60	3.90	3.85	4.00	4.45	5.35
	ATS	2.90	3.65	5.25	5.60	5.00	4.75	5.60	6.20	9.65	9.40	9.40	7.90	6.70	6.95
	Koch	0.75	3.25	4.40	4.95	4.95	4.45	4.55	2.25	4.15	3.95	4.70	4.75	5.60	5.30
	GLMM	13.58	1.41	1.41	1.61	1.21	1.01	0.91	8.10	1.52	1.32	1.62	1.52	1.21	1.32
4*5	parametric	3.30	4.80	3.30	4.25	4.05	4.45	4.70	3.95	4.70	4.85	4.85	5.90	4.95	5.10
	par./ HF-corr.														
	multivariate	4.50	4.55	4.50	5.00	4.70	4.85	4.75	4.15	5.25	4.60	5.45	4.70	5.45	5.25
	Puri & Sen	1.90	4.25	2.80	4.00	3.80	4.35	4.60	2.95	3.90	3.90	4.20	5.20	4.90	4.45
	ATS	3.20	3.60	2.40	3.80	3.50	4.10	4.40	4.70	4.10	5.90	5.50	6.55	6.55	6.00
	Koch	3.10	4.40	3.90	5.10	4.55	4.95	4.80	3.80	4.05	4.65	4.25	5.20	4.45	4.65
	GLMM	0.50	0.20	0.30	0.40	0.50	0.30	0.20	4.88	3.84	3.84	4.26	3.95	4.05	3.84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unequal n
type I error rate
2*4 design
type I error rate
4*5 design
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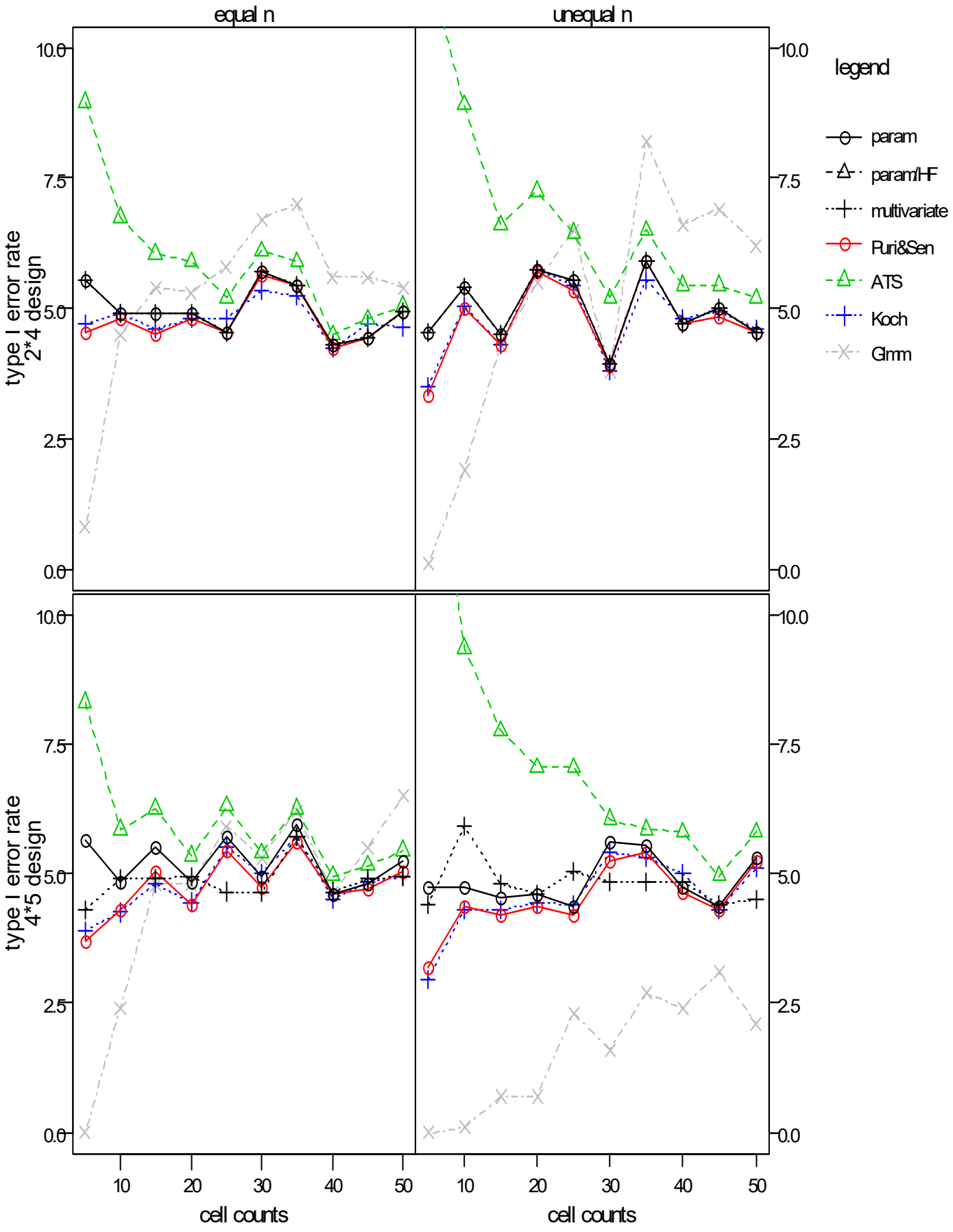
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 2. Main effect A - B significant (effects b_i = 0.6*s)

3. 2. 1. equal correlations on B (r=0.3)

3. 2. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	5.55	4.90	4.90	4.90	5.70	4.30	4.95	4.55	5.40	4.50	5.75	3.95	4.70	4.55
	par./ HF-corr.														
	multivariate	5.55	4.90	4.90	4.90	5.70	4.30	4.95	4.55	5.40	4.50	5.75	3.95	4.70	4.55
	Puri & Sen	4.55	4.80	4.50	4.80	5.65	4.25	4.95	3.35	5.00	4.30	5.70	3.90	4.70	4.55
	ATS	8.95	6.75	6.05	5.90	6.10	4.50	5.05	11.65	8.90	6.60	7.25	5.20	5.45	5.20
	Koch	4.70	4.90	4.60	4.80	5.35	4.25	4.65	3.50	5.05	4.30	5.75	3.80	4.80	4.60
	GLMM	0.8	4.5	5.4	5.3	6.7	5.6	5.4	0.10	1.90	4.30	5.50	3.80	6.60	6.20
4*5	parametric	5.65	4.85	5.50	4.85	4.95	4.60	5.25	4.75	4.75	4.55	4.60	5.60	4.75	5.30
	par./ HF-corr.														
	multivariate	4.30	4.90	4.90	4.95	4.65	4.65	4.95	4.40	5.90	4.80	4.60	4.85	4.85	4.50
	Puri & Sen	3.70	4.30	5.05	4.40	4.75	4.60	5.05	3.20	4.35	4.20	4.35	5.25	4.65	5.25
	ATS	8.30	5.85	6.25	5.35	5.40	4.95	5.45	14.80	9.35	7.75	7.05	6.05	5.80	5.80
	Koch	3.90	4.25	4.80	4.45	5.00	4.50	4.95	2.95	4.30	4.30	4.45	5.40	5.00	5.10
	GLMM	0.00	2.40	4.80	4.80	5.30	4.60	6.50	0.0	0.1	0.7	0.7	1.6	2.4	2.1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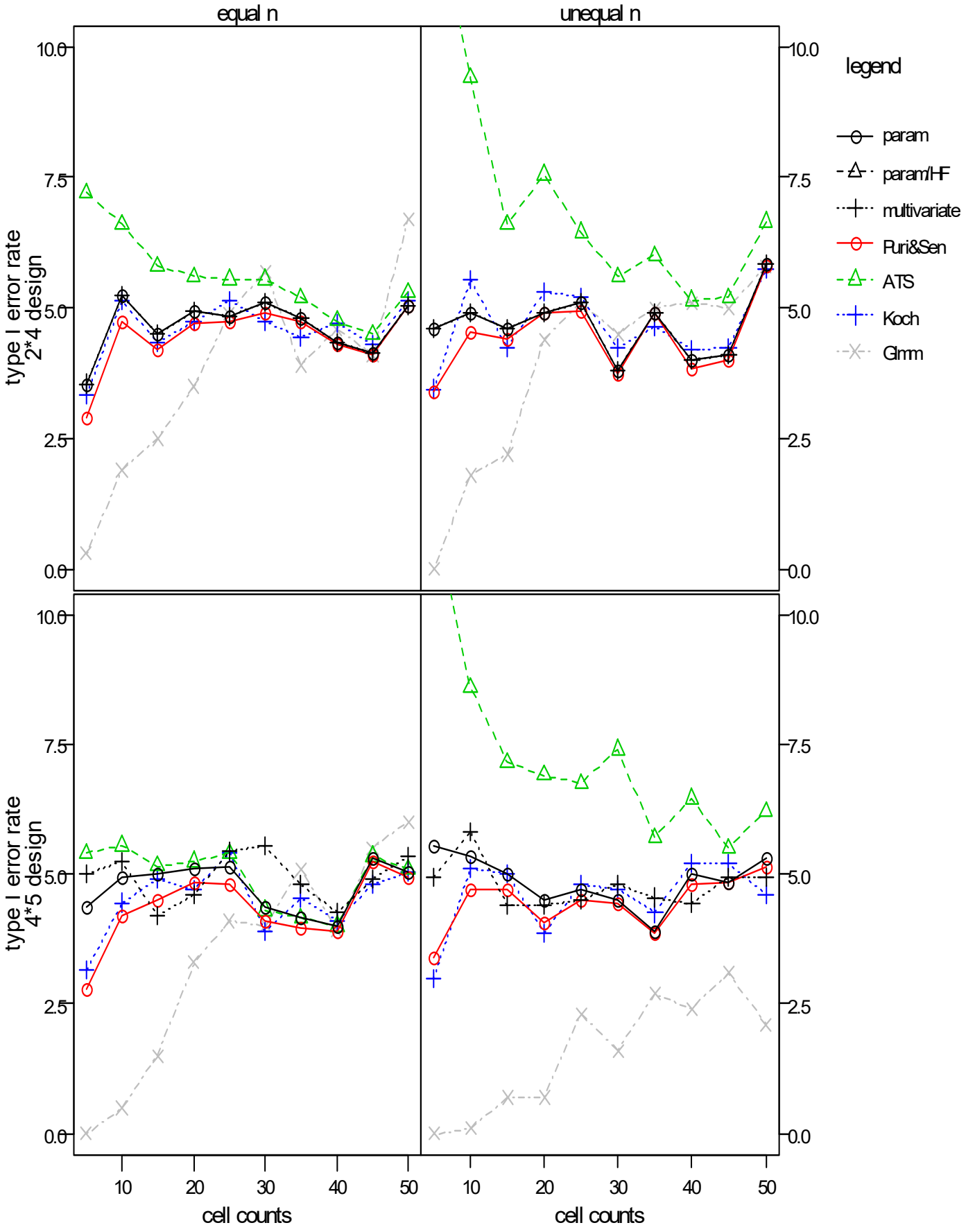
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

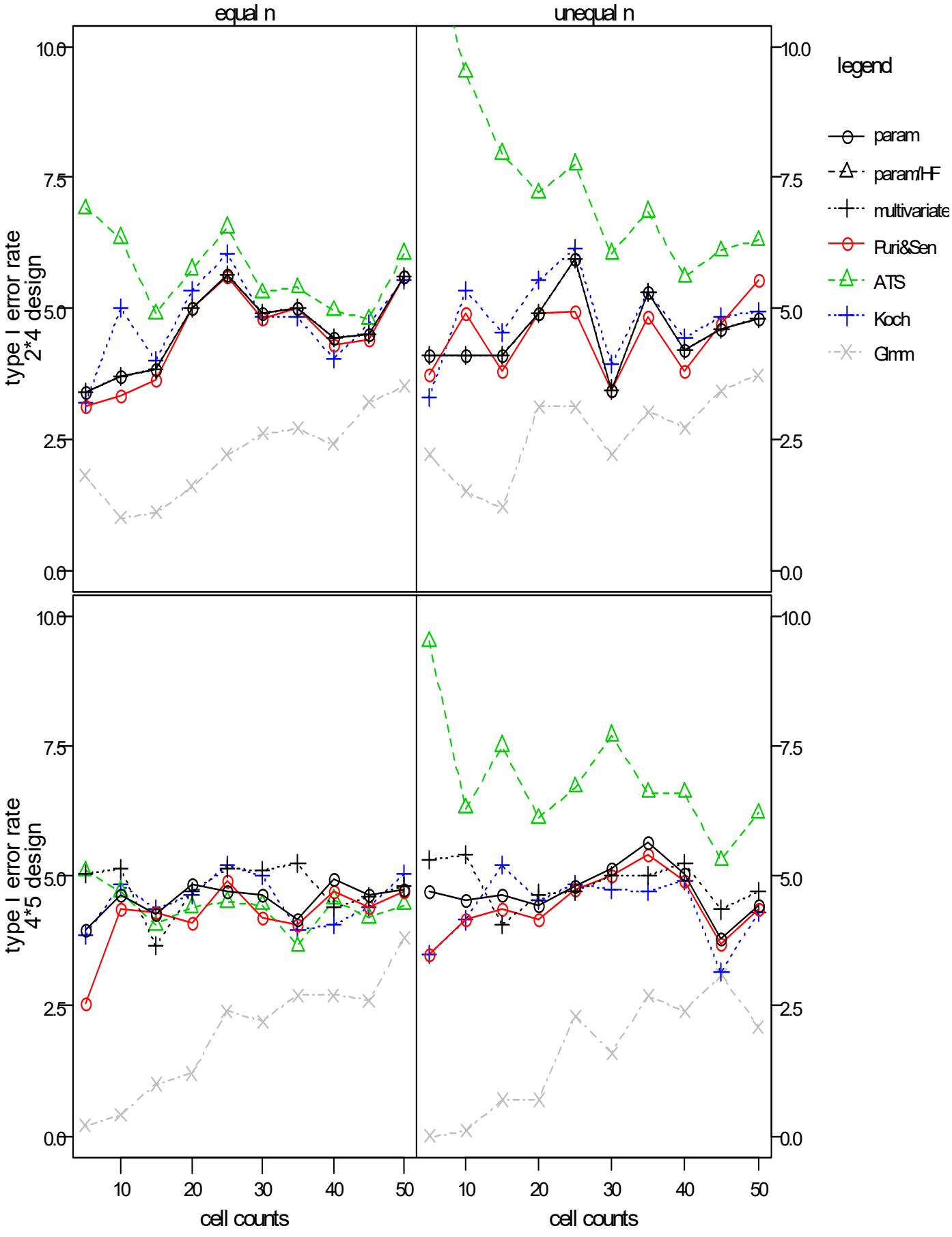
3. 2. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.55	5.25	4.50	4.95	5.10	4.35	5.05	4.60	4.90	4.60	4.90	3.80	4.00	5.85
	par./ HF-corr.														
	multivariate	3.55	5.25	4.50	4.95	5.10	4.35	5.05	4.60	4.90	4.60	4.90	3.80	4.00	5.85
	Puri & Sen	2.90	4.75	4.20	4.70	4.90	4.30	5.05	3.40	4.55	4.40	4.90	3.75	3.85	5.80
	ATS	7.20	6.60	5.80	5.60	5.55	4.75	5.30	13.20	9.40	6.60	7.55	5.60	5.15	6.65
	Koch	3.35	5.15	4.35	4.75	4.75	4.70	5.15	3.45	5.55	4.25	5.30	4.25	4.20	5.75
	GLMM	0.3	1.9	2.5	3.5	5.7	4.6	6.7	0.00	1.80	2.20	4.40	4.50	5.10	5.80
4*5	parametric	4.35	4.95	5.00	5.10	4.35	4.00	5.05	5.55	5.35	5.00	4.50	4.50	5.00	5.30
	par./ HF-corr.														
	multivariate	5.00	5.25	4.20	4.60	5.55	4.25	5.35	4.95	5.80	4.40	4.40	4.80	4.45	4.95
	Puri & Sen	2.80	4.20	4.50	4.85	4.10	3.90	4.95	3.40	4.70	4.70	4.05	4.45	4.80	5.15
	ATS	5.40	5.55	5.15	5.25	4.30	4.00	5.10	12.05	8.60	7.15	6.90	7.40	6.45	6.20
	Koch	3.15	4.45	4.90	4.70	3.90	4.10	5.05	3.00	5.10	5.00	3.85	4.70	5.20	4.60
	GLMM	0.00	0.50	1.50	3.30	4.00	3.90	6.00	0.0	0.1	0.7	0.7	1.6	2.4	2.1


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 2. 1. 3 p = 0.9

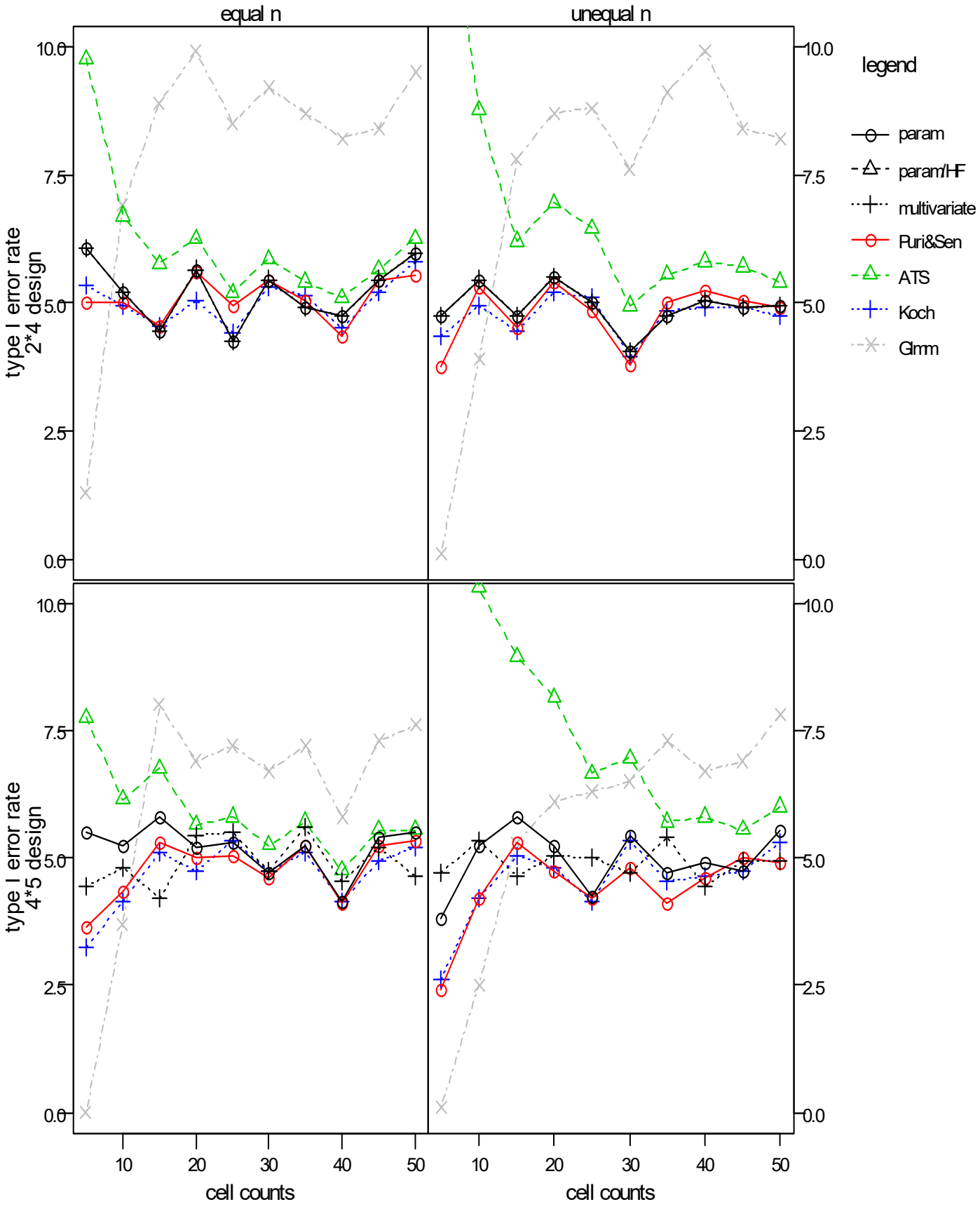
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.40	3.70	3.85	5.00	4.90	4.45	5.60	4.10	4.10	4.10	4.90	3.45	4.20	4.80
	par./ HF-corr.														
	multivariate	3.40	3.70	3.85	5.00	4.90	4.45	5.60	4.10	4.10	4.10	4.90	3.45	4.20	4.80
	Puri & Sen	3.15	3.35	3.65	5.00	4.80	4.30	5.60	3.75	4.90	3.80	4.90	3.45	3.80	5.55
	ATS	6.90	6.35	4.90	5.75	5.30	4.95	6.05	12.05	9.50	7.95	7.20	6.05	5.60	6.30
	Koch	3.20	5.00	4.00	5.35	4.85	4.05	5.55	3.30	5.35	4.55	5.55	3.95	4.45	4.95
	GLMM	1.81	1.00	1.10	1.60	2.61	2.41	3.51	2.21	1.51	1.21	3.12	2.21	2.72	3.72
4*5	parametric	3.95	4.65	4.25	4.85	4.65	4.95	4.75	4.70	4.55	4.65	4.45	5.15	5.05	4.45
	par./ HF-corr.														
	multivariate	5.05	5.15	3.65	4.70	5.10	4.40	4.80	5.30	5.40	4.05	4.65	5.00	5.25	4.70
	Puri & Sen	2.55	4.35	4.30	4.10	4.20	4.70	4.70	3.50	4.15	4.35	4.15	5.00	4.90	4.35
	ATS	5.10	4.70	4.05	4.40	4.45	4.55	4.45	9.50	6.30	7.50	6.10	7.70	6.60	6.20
	Koch	3.85	4.85	4.35	4.65	5.00	4.05	5.05	3.50	4.15	5.20	4.55	4.75	4.90	4.30
	GLMM	0.20	0.40	1.00	1.20	2.20	2.71	3.81	0.00	0.10	0.70	0.70	1.60	2.40	2.10


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 2. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2) (effects b_i = 0.3*s)

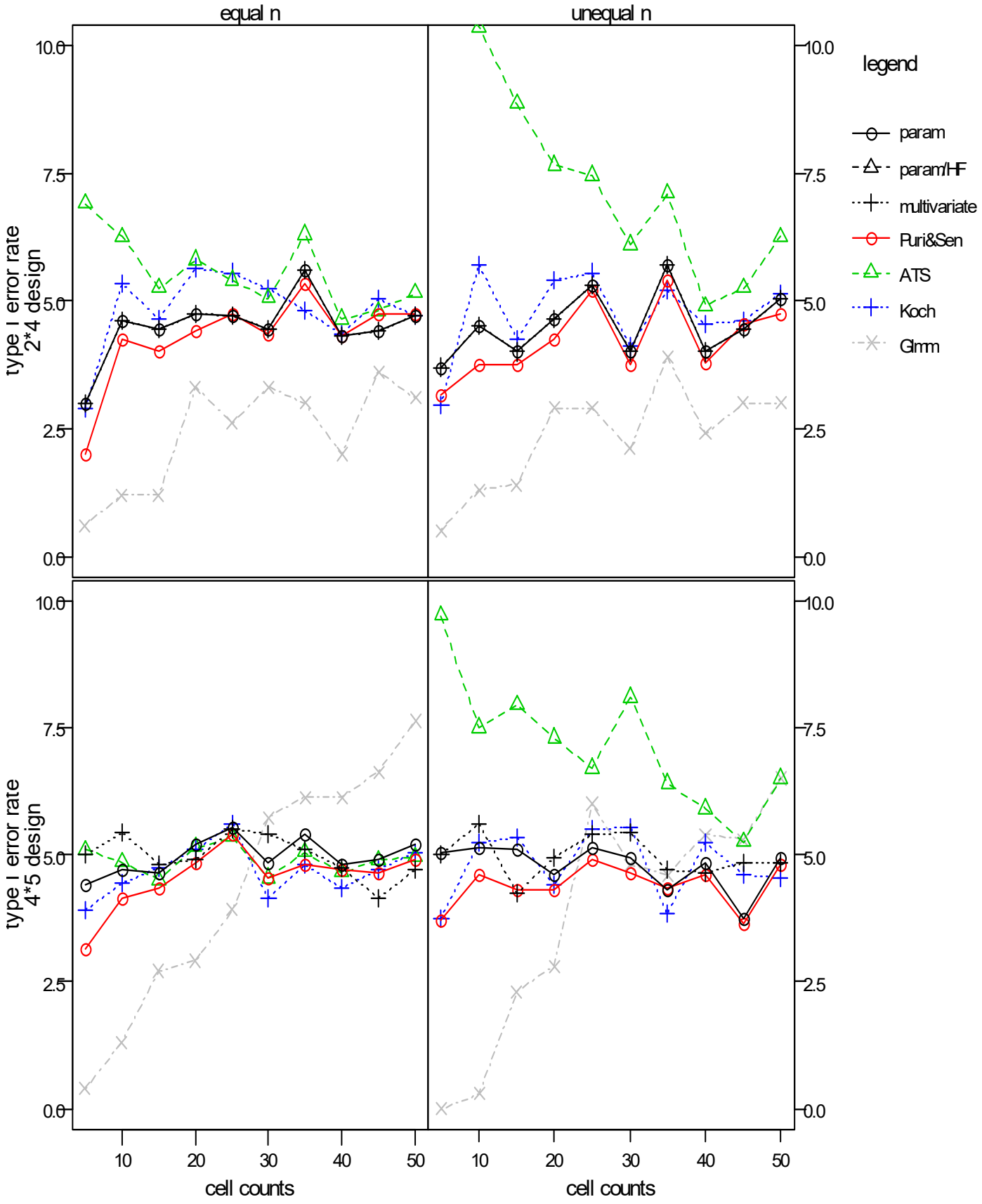
3. 2. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	6.05	5.20	4.45	5.65	5.45	4.75	5.95	4.75	5.45	4.75	5.50	4.05	5.05	4.95
	par./ HF-corr.														
	multivariate	6.05	5.20	4.45	5.65	5.45	4.75	5.95	4.75	5.45	4.75	5.50	4.05	5.05	4.95
	Puri & Sen	5.00	5.00	4.55	5.60	5.45	4.35	5.55	3.75	5.30	4.50	5.40	3.80	5.25	4.90
	ATS	9.75	6.70	5.75	6.25	5.85	5.10	6.25	14.40	8.75	6.20	6.95	4.95	5.80	5.40
	Koch	5.35	4.95	4.55	5.05	5.30	4.50	5.80	4.35	4.95	4.45	5.20	3.95	4.90	4.75
	GLMM	1.30	6.90	8.90	9.90	9.20	8.20	9.50	0.10	3.90	7.80	8.70	7.60	9.90	8.20
4*5	parametric	5.50	5.25	5.80	5.20	4.70	4.15	5.50	3.80	5.25	5.80	5.25	5.45	4.90	5.55
	par./ HF-corr.														
	multivariate	4.45	4.80	4.20	5.45	4.75	4.55	4.65	4.70	5.35	4.65	5.05	4.70	4.45	4.95
	Puri & Sen	3.65	4.35	5.30	5.00	4.60	4.10	5.35	2.40	4.20	5.30	4.75	4.80	4.60	4.90
	ATS	7.75	6.15	6.75	5.65	5.25	4.75	5.55	16.60	10.30	8.95	8.15	6.95	5.80	6.00
	Koch	3.25	4.15	5.10	4.75	4.75	4.15	5.20	2.60	4.20	5.05	4.80	5.35	4.65	5.30
	GLMM	0.00	3.70	8.00	6.90	6.70	5.80	7.60	0.10	2.50	5.30	6.10	6.50	6.70	7.80


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

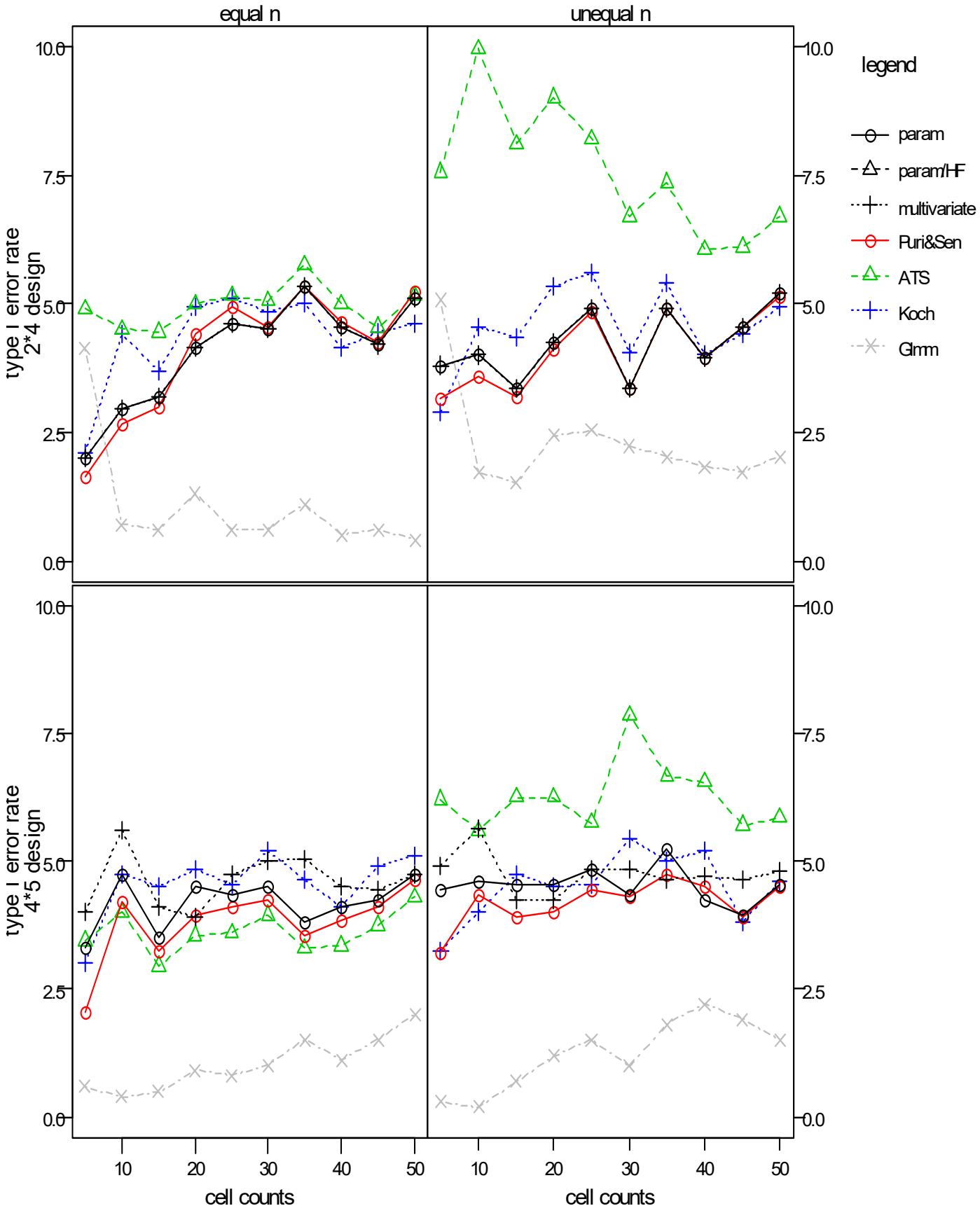
3. 2. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.00	4.60	4.45	4.75	4.45	4.30	4.70	3.70	4.50	4.00	4.65	4.00	4.00	5.05
	par./ HF-corr.														
	multivariate	3.00	4.60	4.45	4.75	4.45	4.30	4.70	3.70	4.50	4.00	4.65	4.00	4.00	5.05
	Puri & Sen	2.00	4.25	4.00	4.40	4.35	4.30	4.75	3.15	3.75	3.75	4.25	3.75	3.80	4.75
	ATS	6.90	6.25	5.25	5.80	5.05	4.65	5.15	11.25	10.35	8.85	7.65	6.10	4.90	6.25
	Koch	2.90	5.35	4.65	5.65	5.25	4.35	4.70	2.95	5.70	4.25	5.40	4.10	4.55	5.15
	GLMM	0.60	1.20	1.20	3.31	3.31	2.00	3.11	0.50	1.30	1.40	2.91	2.10	2.40	3.01
4*5	parametric	4.40	4.70	4.65	5.20	4.85	4.80	5.20	5.05	5.15	5.10	4.60	4.95	4.85	4.95
	par./ HF-corr.														
	multivariate	5.00	5.45	4.80	4.90	5.40	4.75	4.70	5.00	5.60	4.25	4.95	5.45	4.65	4.85
	Puri & Sen	3.15	4.15	4.35	4.85	4.55	4.70	4.90	3.70	4.60	4.30	4.30	4.65	4.60	4.80
	ATS	5.10	4.85	4.50	5.15	4.55	4.65	4.95	9.70	7.50	7.95	7.30	8.10	5.90	6.50
	Koch	3.90	4.45	4.75	5.10	4.15	4.35	5.05	3.75	5.25	5.35	4.40	5.55	5.25	4.55
	GLMM	0.40	1.31	2.71	2.91	5.72	6.12	7.63	0.00	0.30	2.30	2.80	4.80	5.40	6.50


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 2. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	2.00	2.95	3.20	4.15	4.50	4.55	5.10	3.80	4.00	3.35	4.25	3.35	3.95	5.20
	par./ HF-corr.														
	multivariate	2.00	2.95	3.20	4.15	4.50	4.55	5.10	3.80	4.00	3.35	4.25	3.35	3.95	5.20
	Puri & Sen	1.65	2.65	3.00	4.40	4.55	4.65	5.25	3.15	3.60	3.20	4.10	3.35	3.95	5.15
	ATS	4.90	4.50	4.45	5.00	5.05	5.00	5.15	7.55	9.95	8.10	9.00	6.70	6.05	6.70
	Koch	2.10	4.40	3.70	4.95	4.85	4.15	4.60	2.90	4.55	4.35	5.35	4.05	4.00	4.95
	GLMM	4.12	0.70	0.60	1.31	0.60	0.50	0.40	5.07	1.72	1.52	2.43	2.23	1.83	2.03
4*5	parametric	3.30	4.75	3.50	4.50	4.50	4.10	4.75	4.45	4.60	4.55	4.55	4.35	4.25	4.55
	par./ HF-corr.														
	multivariate	4.00	5.60	4.10	3.90	5.00	4.50	4.75	4.90	5.65	4.25	4.25	4.85	4.70	4.80
	Puri & Sen	2.05	4.20	3.25	3.95	4.25	3.85	4.65	3.20	4.35	3.90	4.00	4.30	4.50	4.50
	ATS	3.45	4.00	2.95	3.55	3.95	3.35	4.30	6.20	5.60	6.25	6.25	7.85	6.55	5.85
	Koch	3.00	4.75	4.50	4.85	5.20	4.10	5.10	3.25	4.00	4.75	4.50	5.45	5.20	4.60
	GLMM	0.60	0.40	0.50	0.90	1.00	1.10	2.01	0.30	0.20	0.70	1.20	1.00	2.20	1.50

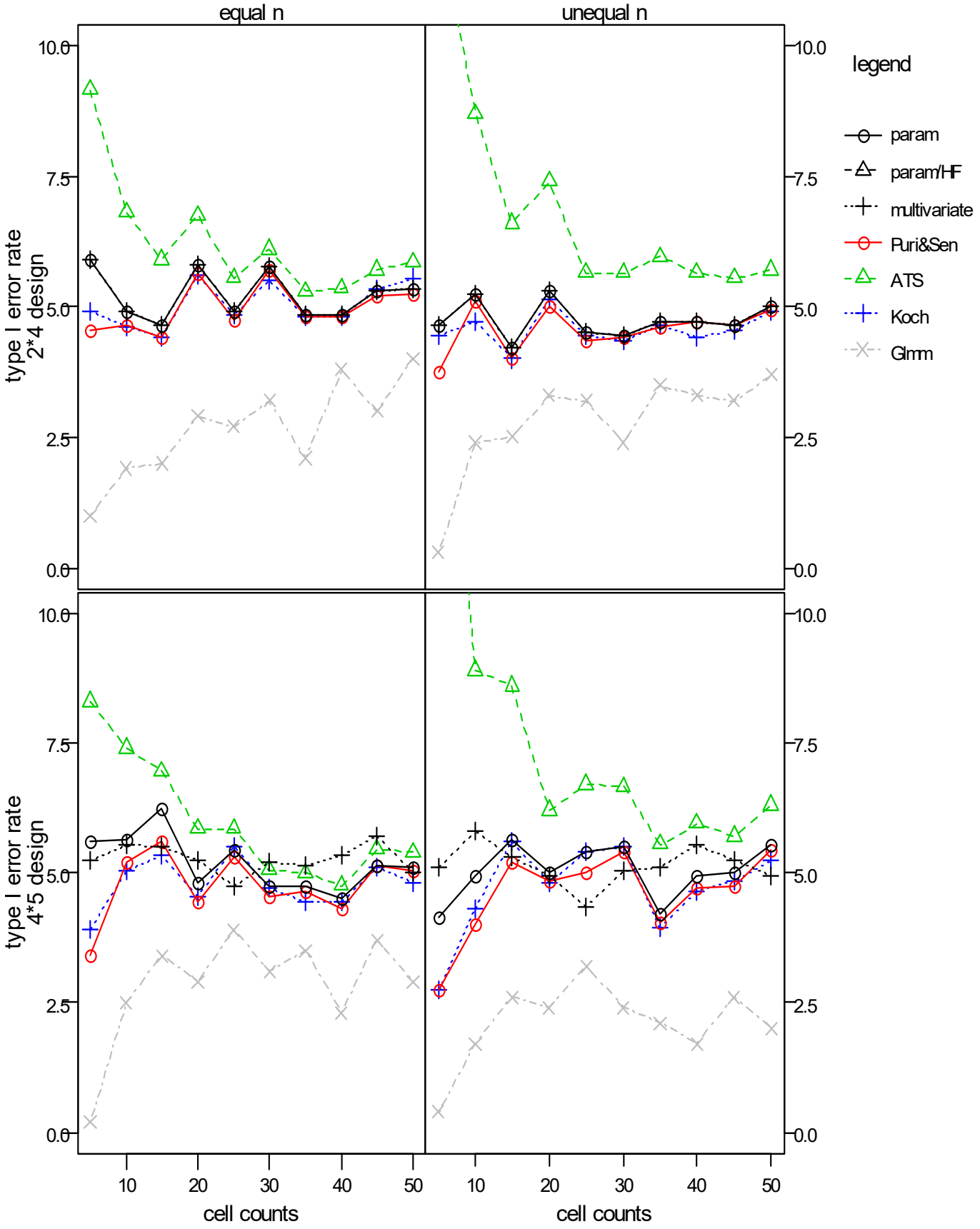

equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 3. Main effect A - Interaction significant (effects ab_{ij} = 0.4*s)

3. 3. 1. equal correlations on B (r=0.3)

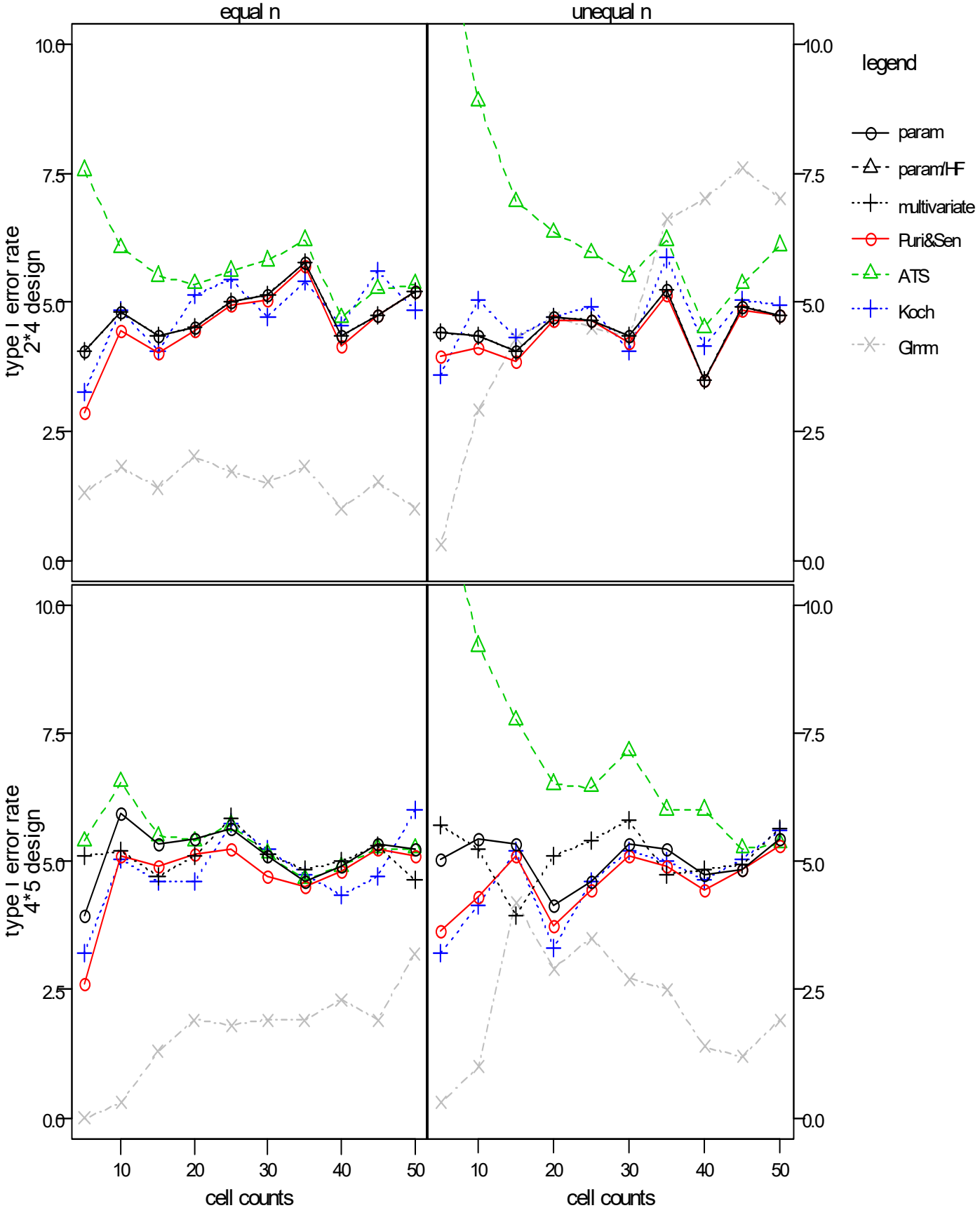
3. 3. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	5.90	4.90	4.65	5.80	5.75	4.85	5.35	4.65	5.25	4.20	5.30	4.45	4.70	5.00
	par./ HF-corr.														
	multivariate	5.90	4.90	4.65	5.80	5.75	4.85	5.35	4.65	5.25	4.20	5.30	4.45	4.70	5.00
	Puri & Sen	4.55	4.65	4.40	5.65	5.70	4.80	5.25	3.75	5.10	4.00	5.00	4.40	4.70	4.95
	ATS	9.15	6.80	5.90	6.75	6.10	5.35	5.85	12.60	8.70	6.60	7.40	5.65	5.65	5.70
	ATS (uncorr.)								12.9	8.8	6.8	6.75	5.5	6.05	5.05
	Koch	4.90	4.60	4.40	5.60	5.50	4.80	5.55	4.45	4.70	4.00	5.15	4.35	4.40	4.90
	GLMM	1.00	1.90	2.00	2.90	3.20	3.80	4.00	0.30	2.40	2.50	3.30	2.40	3.30	3.70
4*5	parametric	5.60	5.65	6.25	4.80	4.75	4.50	5.10	4.15	4.95	5.65	5.00	5.50	4.95	5.55
	par./ HF-corr.														
	multivariate	5.25	5.55	5.50	5.25	5.20	5.35	5.00	5.10	5.80	5.30	4.95	5.05	5.55	4.95
	Puri & Sen	3.40	5.20	5.60	4.45	4.55	4.30	5.05	2.75	4.00	5.20	4.85	5.40	4.70	5.45
	ATS	8.30	7.40	6.95	5.85	5.05	4.75	5.40	16.85	8.90	8.60	6.20	6.65	5.95	6.30
	ATS (uncorr.)								16.25	9.95	9.45	7.1	6.5	6.1	6.25
	Koch	3.90	5.05	5.35	4.55	4.70	4.45	4.80	2.75	4.30	5.60	4.80	5.50	4.65	5.25
	GLMM	0.20	2.50	3.40	2.90	3.10	2.30	2.90	0.40	1.70	2.60	2.40	2.40	1.70	2.00


equal n
unequal n
type I error rate
2*4 design
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm
0.0
2.5
5.0
7.5
10.0
10
20
30
40
50

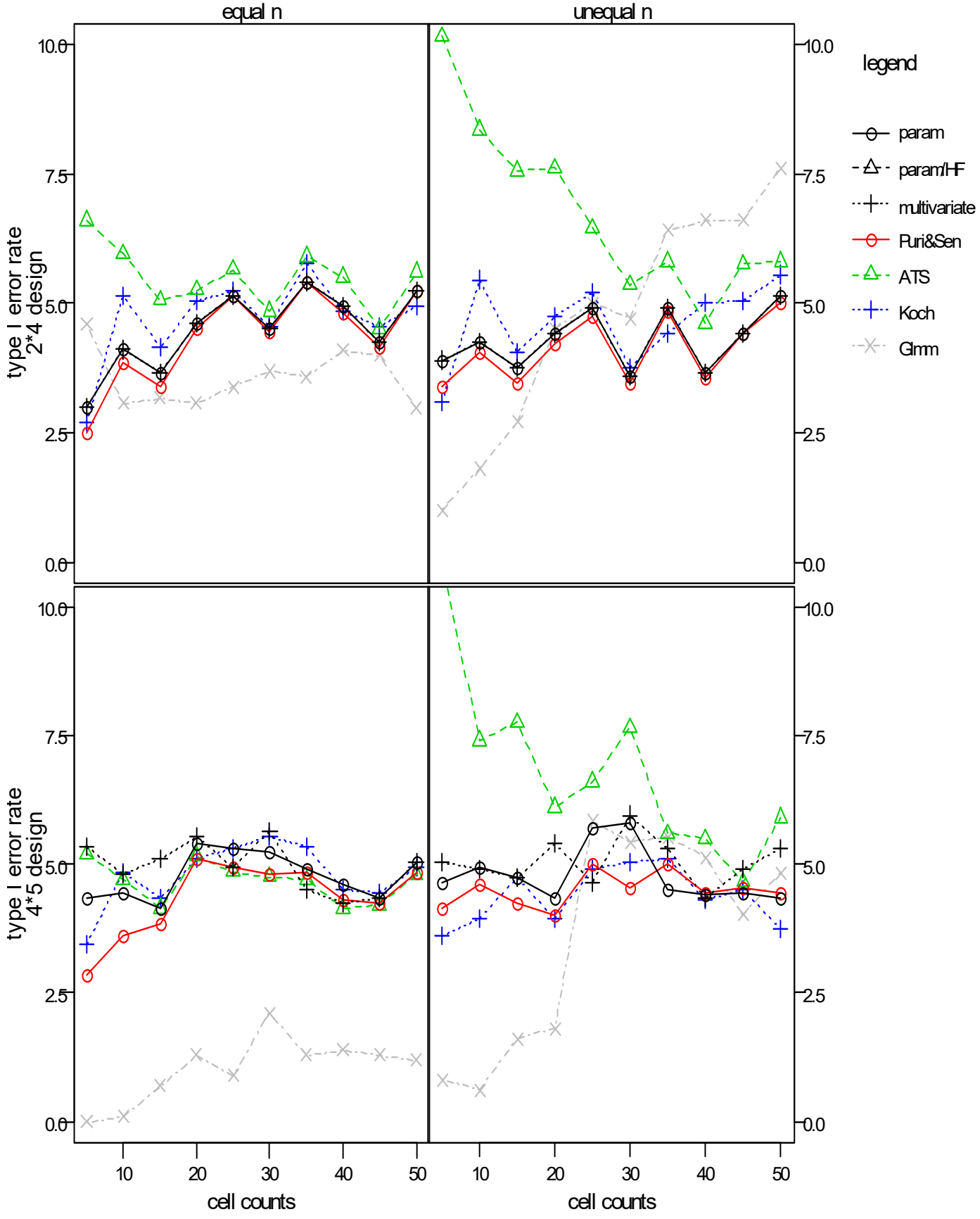
3. 3. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	4.05	4.80	4.35	4.50	5.15	4.35	5.20	4.40	4.35	4.05	4.70	4.35	3.50	4.75
	par./ HF-corr.														
	multivariate	4.05	4.80	4.35	4.50	5.15	4.35	5.20	4.40	4.35	4.05	4.70	4.35	3.50	4.75
	Puri & Sen	2.85	4.45	4.00	4.45	5.05	4.15	5.20	3.95	4.10	3.85	4.65	4.20	3.50	4.75
	ATS	7.55	6.05	5.50	5.35	5.80	4.70	5.35	12.75	8.90	6.95	6.35	5.50	4.50	6.10
	ATS (uncorr.)								12.55	8.75	7.55	7.65	5.6	4.9	6.0
	Koch	3.25	4.85	4.05	5.15	4.70	4.55	4.85	3.60	5.05	4.30	4.70	4.05	4.15	4.95
	GLMM	1.31	1.81	1.41	2.01	1.51	1.01	1.01	0.30	2.90	4.30	4.70	4.30	7.00	7.00
4*5	parametric	3.95	5.95	5.35	5.45	5.10	4.90	5.25	5.05	5.45	5.35	4.15	5.35	4.75	5.45
	par./ HF-corr.														
	multivariate	5.10	5.20	4.70	5.10	5.15	5.00	4.65	5.70	5.25	3.95	5.10	5.80	4.85	5.65
	Puri & Sen	2.60	5.10	4.90	5.15	4.70	4.80	5.10	3.65	4.30	5.10	3.75	5.10	4.45	5.30
	ATS	5.40	6.55	5.50	5.40	5.15	4.90	5.25	12.50	9.20	7.75	6.50	7.15	6.00	5.35
	ATS (uncorr.)								11.5	7.9	8.7	7.05	7.8	6.25	6.05
	Koch	3.20	5.05	4.60	4.60	5.25	4.35	6.00	3.20	4.15	5.20	3.30	5.20	4.65	5.60
	GLMM	0.00	0.30	1.30	1.90	1.90	2.30	3.20	0.30	1.00	4.20	2.90	2.70	1.40	1.90


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 3. 1. 3 p = 0.9

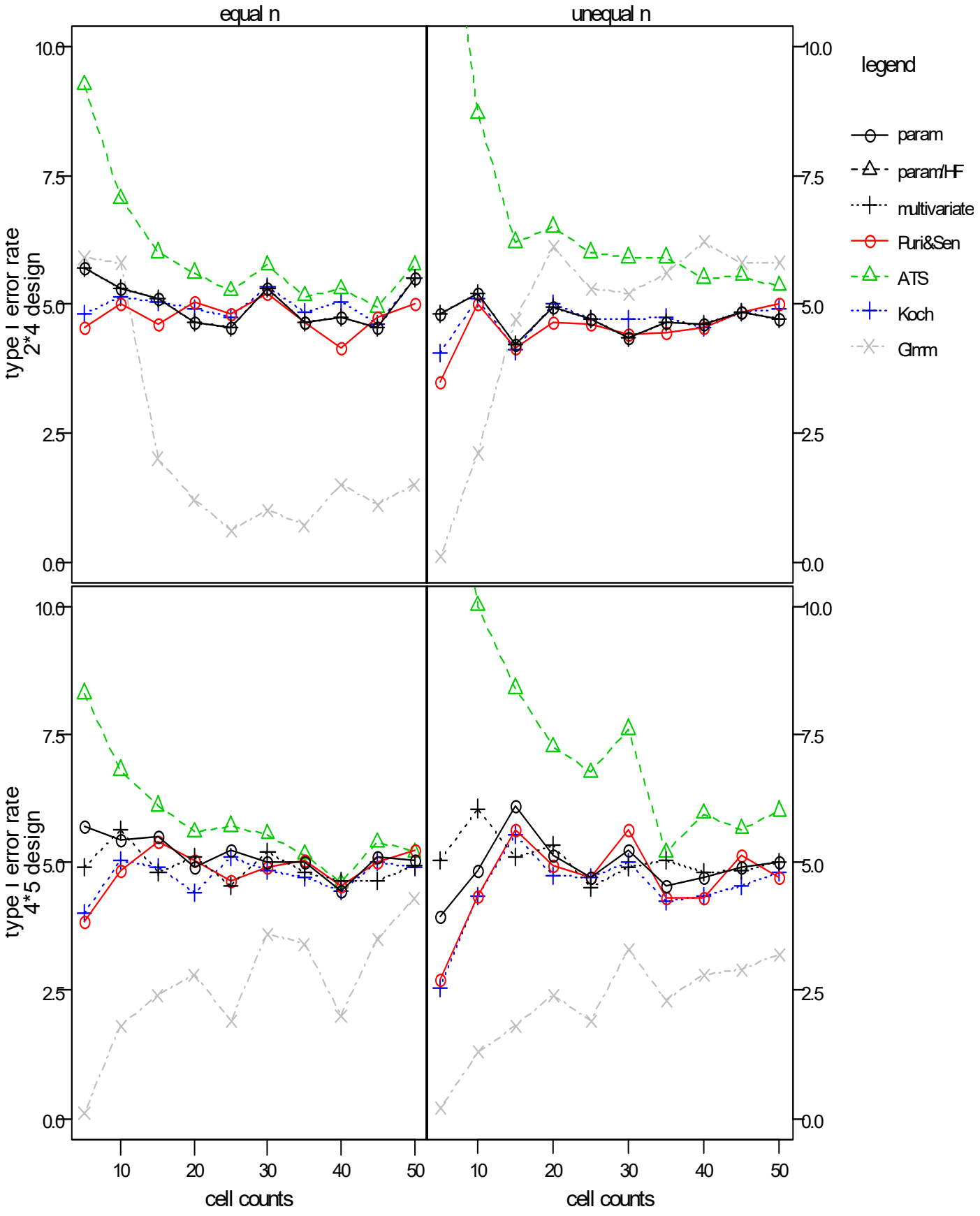
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.00	4.10	3.65	4.60	4.50	4.95	5.25	3.90	4.25	3.75	4.40	3.60	3.65	5.15
	par./ HF-corr.														
	multivariate	3.00	4.10	3.65	4.60	4.50	4.95	5.25	3.90	4.25	3.75	4.40	3.60	3.65	5.15
	Puri & Sen	2.50	3.85	3.40	4.50	4.45	4.80	5.25	3.40	4.05	3.45	4.20	3.45	3.55	5.00
	ATS	6.60	5.95	5.05	5.25	4.85	5.50	5.60	10.15	8.35	7.55	7.60	5.35	4.60	5.80
	ATS (uncorr.)								9.65	10.1	7.5	8.35	6.0	5.25	6.3
	Koch	2.70	5.15	4.15	5.05	4.55	4.85	4.95	3.10	5.45	4.05	4.75	3.75	5.00	5.55
	GLMM	4.61	3.07	3.17	3.07	3.68	4.09	2.97	1.00	1.80	2.70	4.50	4.70	6.60	7.60
4*5	parametric	4.35	4.45	4.15	5.40	5.25	4.60	5.05	4.65	4.95	4.75	4.35	5.80	4.40	4.35
	par./ HF-corr.														
	multivariate	5.35	4.80	5.10	5.55	5.65	4.25	5.05	5.05	4.90	4.75	5.40	5.95	4.35	5.30
	Puri & Sen	2.85	3.60	3.85	5.10	4.80	4.30	4.85	4.15	4.60	4.25	4.00	4.55	4.45	4.45
	ATS	5.20	4.70	4.15	5.15	4.75	4.15	4.80	10.90	7.40	7.75	6.10	7.65	5.50	5.90
	ATS (uncorr.)								8.0	6.5	7.05	6.1	7.25	6.3	5.3
	Koch	3.45	4.85	4.35	5.10	5.55	4.50	4.95	3.60	3.95	4.75	3.95	5.05	4.30	3.75
	GLMM	0.00	0.10	0.70	1.30	2.10	1.40	1.20	0.80	0.60	1.61	1.81	5.43	5.13	4.83


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 3. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

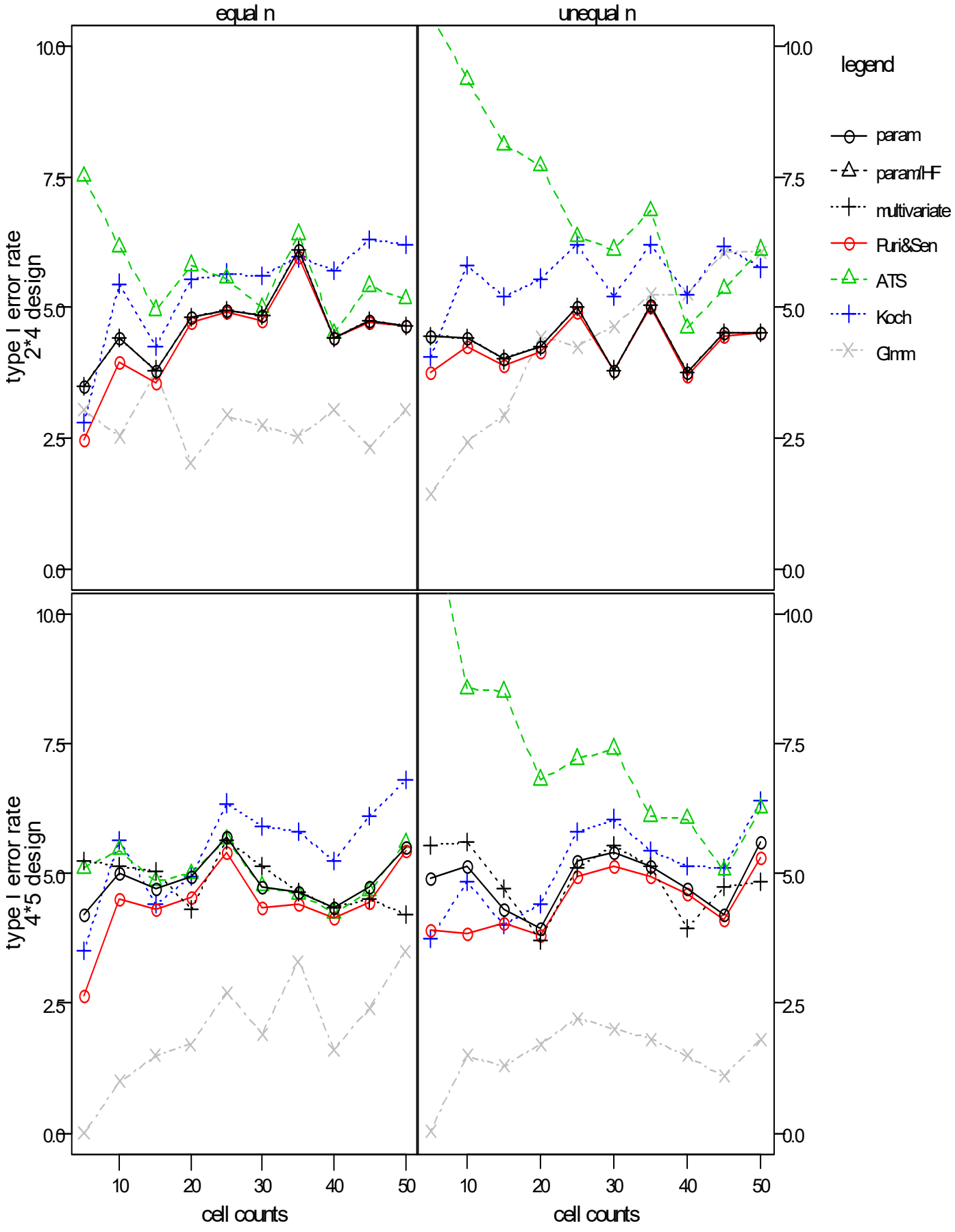
3. 3. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	5.70	5.30	5.10	4.65	5.30	4.75	5.50	4.80	5.20	4.20	4.95	4.35	4.60	4.70
	par./ HF-corr.														
	multivariate	5.70	5.30	5.10	4.65	5.30	4.75	5.50	4.80	5.20	4.20	4.95	4.35	4.60	4.70
	Puri & Sen	4.55	5.00	4.60	5.05	5.20	4.15	5.00	3.50	5.00	4.15	4.65	4.40	4.55	5.00
	ATS	9.25	7.05	6.00	5.60	5.75	5.30	5.75	14.20	8.70	6.20	6.50	5.90	5.50	5.35
	ATS (uncorr.)								13.85	8.55	6.55	6.85	5.5	5.8	4.9
	Koch	4.80	5.15	5.05	4.90	5.35	5.05	5.50	4.05	5.10	4.10	5.00	4.70	4.55	4.90
	GLMM	5.90	5.80	2.00	1.20	1.00	1.50	1.50	0.10	2.10	4.70	6.10	5.20	6.20	5.80
4*5	parametric	5.70	5.45	5.50	4.90	5.00	4.45	5.05	3.95	4.85	6.10	5.15	5.25	4.70	5.00
	par./ HF-corr.														
	multivariate	4.90	5.65	4.80	5.10	5.20	4.65	4.95	5.05	6.05	5.10	5.35	4.90	4.80	5.00
	Puri & Sen	3.85	4.85	5.40	5.05	4.90	4.55	5.25	2.70	4.35	5.65	4.95	5.65	4.30	4.70
	ATS	8.30	6.80	6.10	5.60	5.55	4.60	5.20	16.20	10.00	8.40	7.25	7.60	5.95	6.00
	ATS (uncorr.)								16.95	10.7	9.00	7.55	7.05	5.8	6.00
	Koch	4.00	5.05	4.90	4.40	4.85	4.45	4.90	2.55	4.35	5.55	4.75	5.00	4.35	4.80
	GLMM	0.10	1.80	2.40	2.80	3.60	2.00	4.30	0.20	1.30	1.80	2.40	3.30	2.80	3.20


equal n
unequal n
type I error rate
2*4 design
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

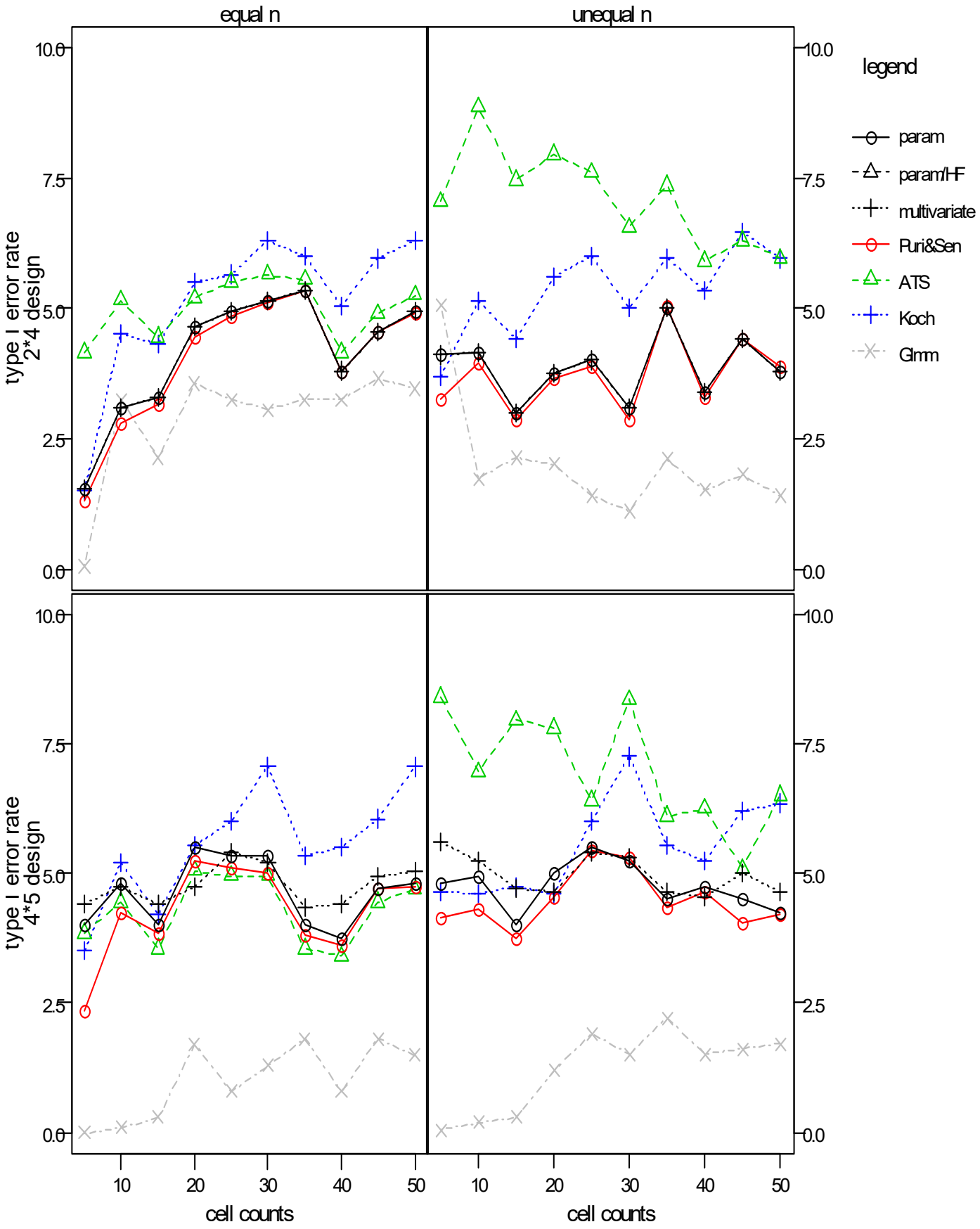
3. 3. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.50	4.40	3.80	4.80	4.85	4.40	4.65	4.45	4.40	4.00	4.25	3.80	3.75	4.50
	par./ HF-corr.														
	multivariate	3.50	4.40	3.80	4.80	4.85	4.40	4.65	4.45	4.40	4.00	4.25	3.80	3.75	4.50
	Puri & Sen	2.45	3.95	3.55	4.70	4.75	4.40	4.65	3.75	4.25	3.90	4.15	3.80	3.70	4.50
	ATS	7.50	6.15	4.95	5.80	5.00	4.50	5.15	10.60	9.35	8.10	7.70	6.10	4.60	6.10
	ATS (uncorr.)								9.55	10	8.05	8.00	6.5	5.15	5.9
	Koch	2.80	5.45	4.25	5.55	5.60	5.70	6.20	4.05	5.80	5.20	5.55	5.20	5.25	5.75
	GLMM	3.04	2.53	3.74	2.02	2.73	3.04	3.04	1.41	2.42	2.92	4.44	4.64	5.24	6.05
4*5	parametric	4.20	5.00	4.70	4.95	4.75	4.35	5.50	4.90	5.15	4.30	3.95	5.40	4.70	5.60
	par./ HF-corr.														
	multivariate	5.25	5.15	5.05	4.30	5.15	4.35	4.20	5.55	5.60	4.70	3.70	5.55	3.95	4.85
	Puri & Sen	2.65	4.50	4.30	4.55	4.35	4.15	5.45	3.90	3.85	4.05	3.80	5.15	4.60	5.30
	ATS	5.10	5.45	4.85	5.00	4.75	4.25	5.60	12.10	8.55	8.50	6.80	7.40	6.05	6.25
	ATS (uncorr.)								10.55	8.55	8.00	6.3	7.7	6.2	6.1
	Koch	3.50	5.65	4.40	4.95	5.90	5.25	6.80	3.75	4.85	4.00	4.40	6.05	5.15	6.40
	GLMM	0.00	1.00	1.50	1.70	1.90	1.60	3.50	0.05	1.50	1.30	1.70	2.00	1.50	1.80


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 3. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	1.55	3.10	3.30	4.65	5.15	3.80	4.95	4.10	4.15	3.00	3.75	3.10	3.40	3.80
	par./ HF-corr.														
	multivariate	1.55	3.10	3.30	4.65	5.15	3.80	4.95	4.10	4.15	3.00	3.75	3.10	3.40	3.80
	Puri & Sen	1.30	2.80	3.15	4.45	5.10	3.80	4.90	3.25	3.95	2.85	3.65	2.85	3.30	3.90
	ATS	4.15	5.15	4.45	5.20	5.65	4.15	5.25	7.05	8.85	7.45	7.95	6.55	5.90	5.95
	ATS (uncorr.)								6.05	9.1	7.9	8.65	6.85	5.9	5.75
	Koch	1.50	4.50	4.30	5.50	6.30	5.05	6.30	3.70	5.15	4.40	5.60	5.00	5.35	5.95
	GLMM	0.05	3.25	2.13	3.55	3.05	3.25	3.45	5.07	1.72	2.13	2.01	1.11	1.51	1.41
4*5	parametric	4.00	4.80	4.00	5.50	5.35	3.75	4.80	4.80	4.95	4.00	5.00	5.25	4.75	4.25
	par./ HF-corr.														
	multivariate	4.40	4.75	4.40	4.75	5.20	4.40	5.05	5.60	5.25	4.70	4.65	5.30	4.55	4.65
	Puri & Sen	2.35	4.25	3.85	5.25	5.00	3.60	4.75	4.15	4.30	3.75	4.55	5.30	4.65	4.20
	ATS	3.85	4.45	3.55	5.05	4.95	3.40	4.70	8.40	6.95	7.95	7.80	8.35	6.25	6.50
	ATS (uncorr.)								6.35	5.5	6.2	6.7	8.9	6.55	5.8
	Koch	3.50	5.20	4.20	5.55	7.05	5.50	7.05	4.65	4.60	4.75	4.60	7.25	5.25	6.35
	GLMM	0.00	0.10	0.30	1.70	1.30	0.80	1.50	0.05	0.20	0.30	1.20	1.50	1.50	1.70

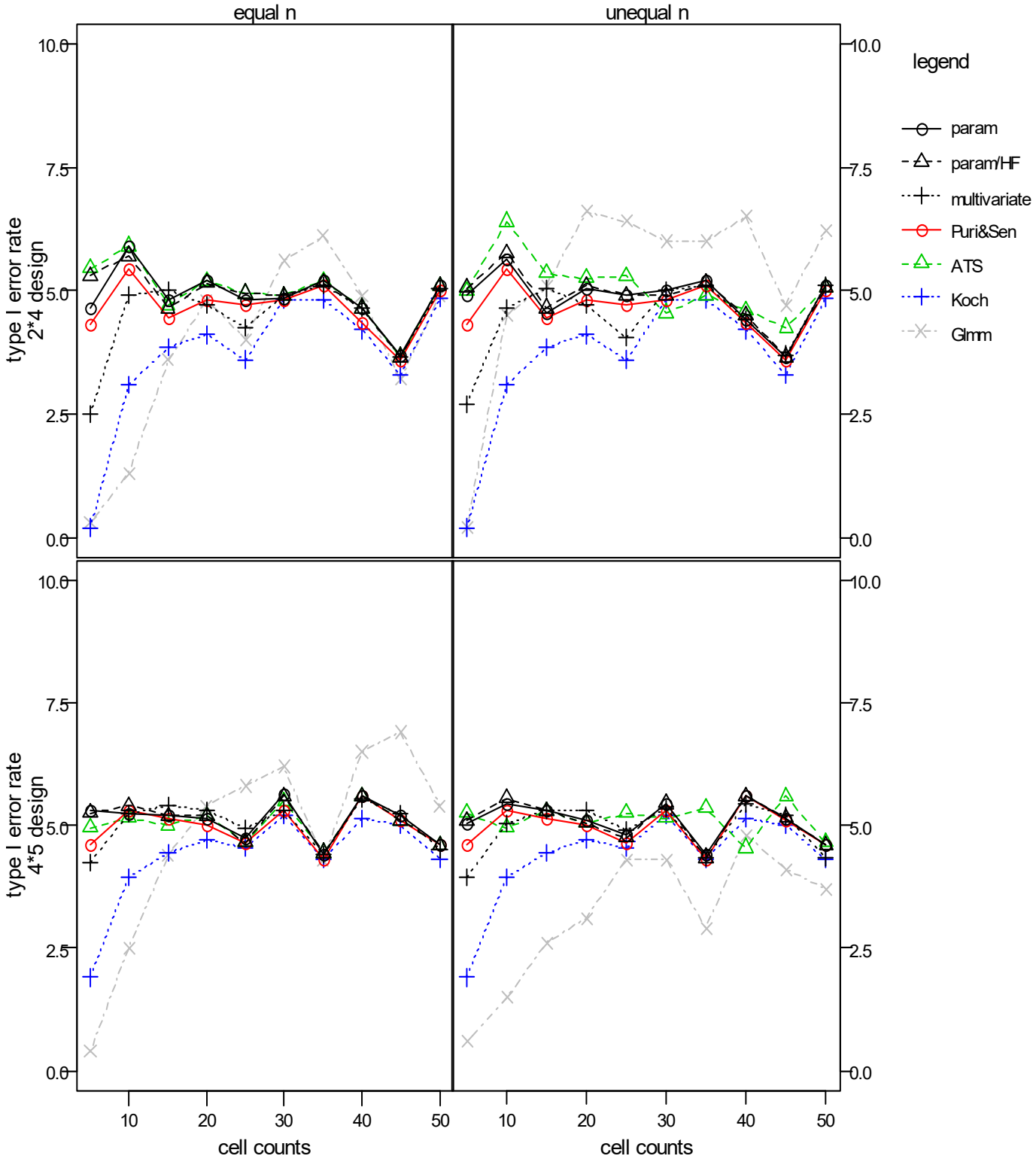

equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 4. Main effect B - null model

3. 4. 1. equal correlations on B (r=0.3)

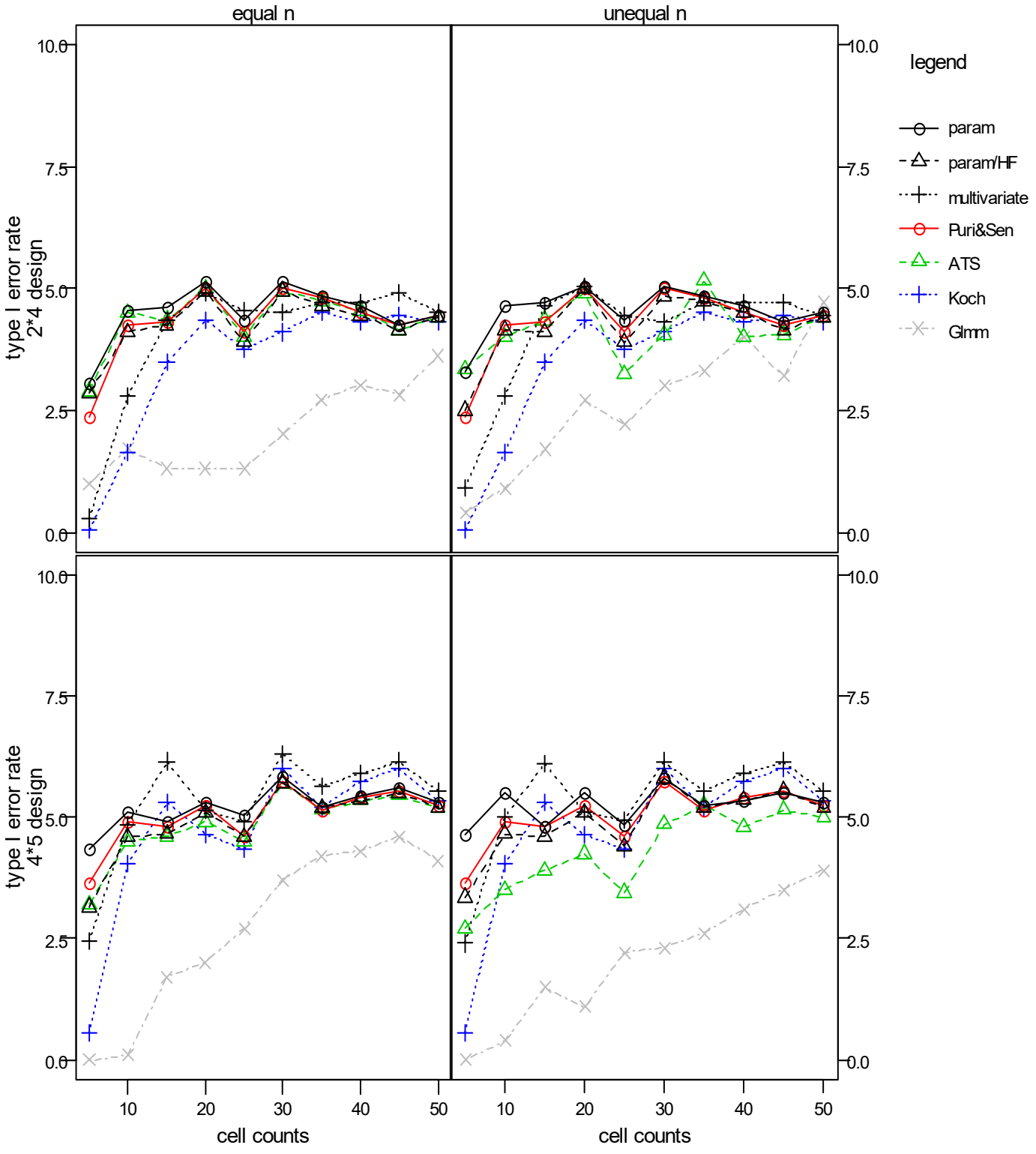
3. 4. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	4.65	5.90	4.80	5.20	4.85	4.65	5.10	4.90	5.65	4.55	5.05	5.00	4.40	5.10
	par./ HF-corr.	5.30	5.70	4.65	5.15	4.90	4.65	5.10	5.05	5.75	4.65	5.10	4.90	4.50	5.05
	multivariate	2.50	4.90	5.00	4.70	4.90	4.65	5.05	2.70	4.65	5.05	4.70	5.00	4.40	5.10
	Puri & Sen	4.30	5.45	4.45	4.80	4.80	4.35	5.00	4.30	5.45	4.45	4.80	4.80	4.35	5.00
	ATS	5.45	5.90	4.70	5.20	4.90	4.65	5.10	5.00	6.40	5.35	5.25	4.55	4.60	5.05
	Koch	0.20	3.10	3.85	4.10	4.80	4.20	4.85	0.20	3.10	3.85	4.10	4.80	4.20	4.85
	GLMM	0.30	1.30	3.60	4.80	5.60	4.90	4.90	0.20	4.50	5.10	6.60	6.00	6.50	6.20
4*5	parametric	5.30	5.25	5.20	5.15	5.65	5.60	4.60	5.05	5.45	5.30	5.10	5.45	5.60	4.60
	par./ HF-corr.	5.25	5.40	5.20	5.20	5.60	5.60	4.60	5.10	5.55	5.30	5.05	5.45	5.60	4.60
	multivariate	4.25	5.25	5.40	5.30	5.30	5.55	4.50	3.95	5.05	5.30	5.30	5.35	5.45	4.35
	Puri & Sen	4.60	5.30	5.15	5.00	5.30	5.60	4.60	4.60	5.30	5.15	5.00	5.30	5.60	4.60
	ATS	4.95	5.15	5.00	5.20	5.50	5.60	4.60	5.25	4.95	5.30	5.05	5.15	4.55	4.65
	Koch	1.90	3.95	4.45	4.70	5.20	5.15	4.30	1.90	3.95	4.45	4.70	5.20	5.15	4.30
	GLMM	0.40	2.50	4.40	5.40	6.20	6.50	5.40	0.60	1.50	2.60	3.10	4.30	4.80	3.70


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

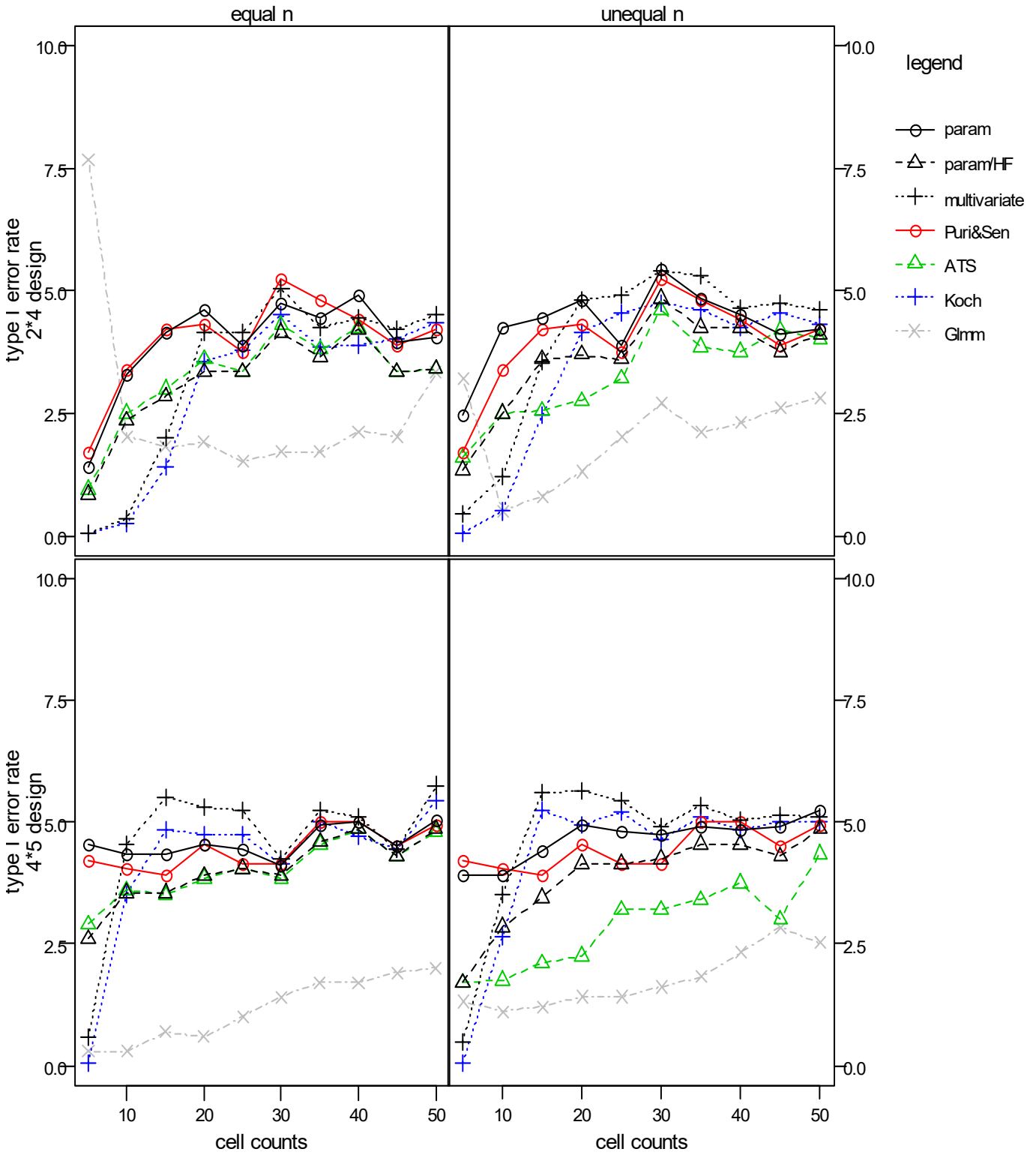
3. 4. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.05	4.55	4.60	5.15	5.15	4.65	4.45	3.30	4.65	4.70	5.05	5.05	4.65	4.50
	par./ HF-corr.	2.85	4.10	4.25	4.95	4.95	4.45	4.40	2.50	4.15	4.10	5.00	4.85	4.50	4.40
	multivariate	0.30	2.80	4.35	4.90	4.50	4.70	4.50	0.90	2.80	4.65	5.05	4.30	4.70	4.45
	Puri & Sen	2.35	4.25	4.30	5.00	5.00	4.50	4.45	2.35	4.25	4.30	5.00	5.00	4.50	4.45
	ATS	2.90	4.50	4.35	5.00	4.95	4.55	4.40	3.35	4.00	4.35	4.90	4.05	4.00	4.40
	Koch	0.05	1.65	3.50	4.35	4.10	4.30	4.30	0.05	1.65	3.50	4.35	4.10	4.30	4.30
	GLMM	1.01	1.71	1.31	1.31	2.01	3.02	3.62	0.40	0.90	1.70	2.71	3.01	4.01	4.71
4*5	parametric	4.35	5.10	4.90	5.30	5.85	5.45	5.30	4.65	5.50	4.80	5.50	5.80	5.35	5.30
	par./ HF-corr.	3.15	4.60	4.65	5.10	5.70	5.35	5.20	3.35	4.65	4.60	5.10	5.80	5.35	5.20
	multivariate	2.45	4.85	6.15	5.15	6.30	5.90	5.55	2.40	5.00	6.10	5.10	6.15	5.90	5.55
	Puri & Sen	3.65	4.90	4.80	5.25	5.75	5.40	5.25	3.65	4.90	4.80	5.25	5.75	5.40	5.25
	ATS	3.20	4.50	4.60	4.90	5.70	5.35	5.20	2.70	3.50	3.90	4.25	4.85	4.80	5.00
	Koch	0.55	4.05	5.30	4.65	6.00	5.75	5.35	0.55	4.05	5.30	4.65	6.00	5.75	5.35
	GLMM	0.00	0.10	1.70	2.00	3.70	4.30	4.10	0.00	0.40	1.50	1.10	2.30	3.10	3.90


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 4. 1. 3 p = 0.9

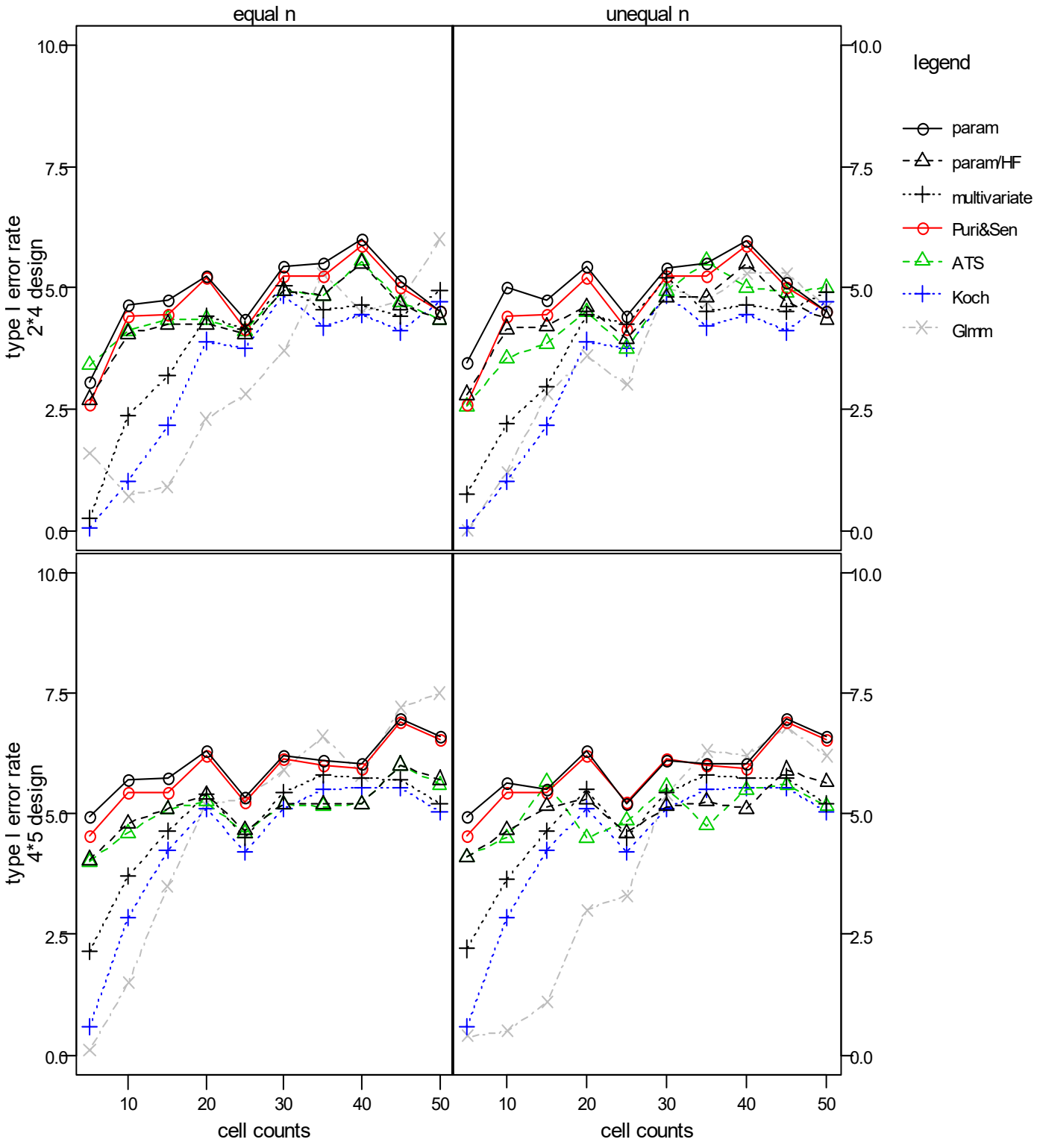
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	1.40	3.30	4.15	4.60	4.75	4.90	4.05	2.45	4.25	4.45	4.80	5.45	4.50	4.20
	par./ HF-corr.	0.85	2.35	2.85	3.35	4.15	4.20	3.40	1.35	2.50	3.60	3.70	4.85	4.25	4.10
	multivariate	0.05	0.35	2.00	4.15	5.05	4.45	4.50	0.45	1.20	3.55	4.80	5.40	4.65	4.60
	Puri & Sen	1.70	3.40	4.20	4.30	5.25	4.40	4.20	1.70	3.40	4.20	4.30	5.25	4.40	4.20
	ATS	0.95	2.50	3.00	3.60	4.30	4.25	3.40	1.60	2.50	2.55	2.75	4.60	3.75	4.00
	Koch	0.05	0.25	1.40	3.55	4.50	3.90	4.35	0.05	0.50	2.45	4.15	4.75	4.25	4.30
	GLMM	7.67	2.02	1.82	1.92	1.72	2.12	3.33	3.21	0.50	0.80	1.31	2.71	2.31	2.81
4*5	parametric	4.55	4.35	4.35	4.55	4.10	5.00	5.05	3.90	3.90	4.40	4.95	4.75	4.85	5.25
	par./ HF-corr.	2.60	3.55	3.55	3.90	3.90	4.85	4.85	1.70	2.85	3.45	4.15	4.25	4.55	4.85
	multivariate	0.60	4.55	5.50	5.30	4.25	5.10	5.75	0.50	3.50	5.60	5.65	4.90	5.05	5.10
	Puri & Sen	4.20	4.05	3.90	4.55	4.15	5.00	4.95	4.20	4.05	3.90	4.55	4.15	5.00	4.95
	ATS	2.90	3.60	3.50	3.85	3.85	4.85	4.80	1.70	1.75	2.10	2.25	3.20	3.75	4.35
	Koch	0.05	3.50	4.85	4.75	4.15	4.70	5.45	0.05	2.65	5.25	4.95	4.65	4.85	5.00
	GLMM	0.30	0.30	0.70	0.60	1.40	1.70	2.00	1.31	1.11	1.21	1.42	1.62	2.33	2.53


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 4. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

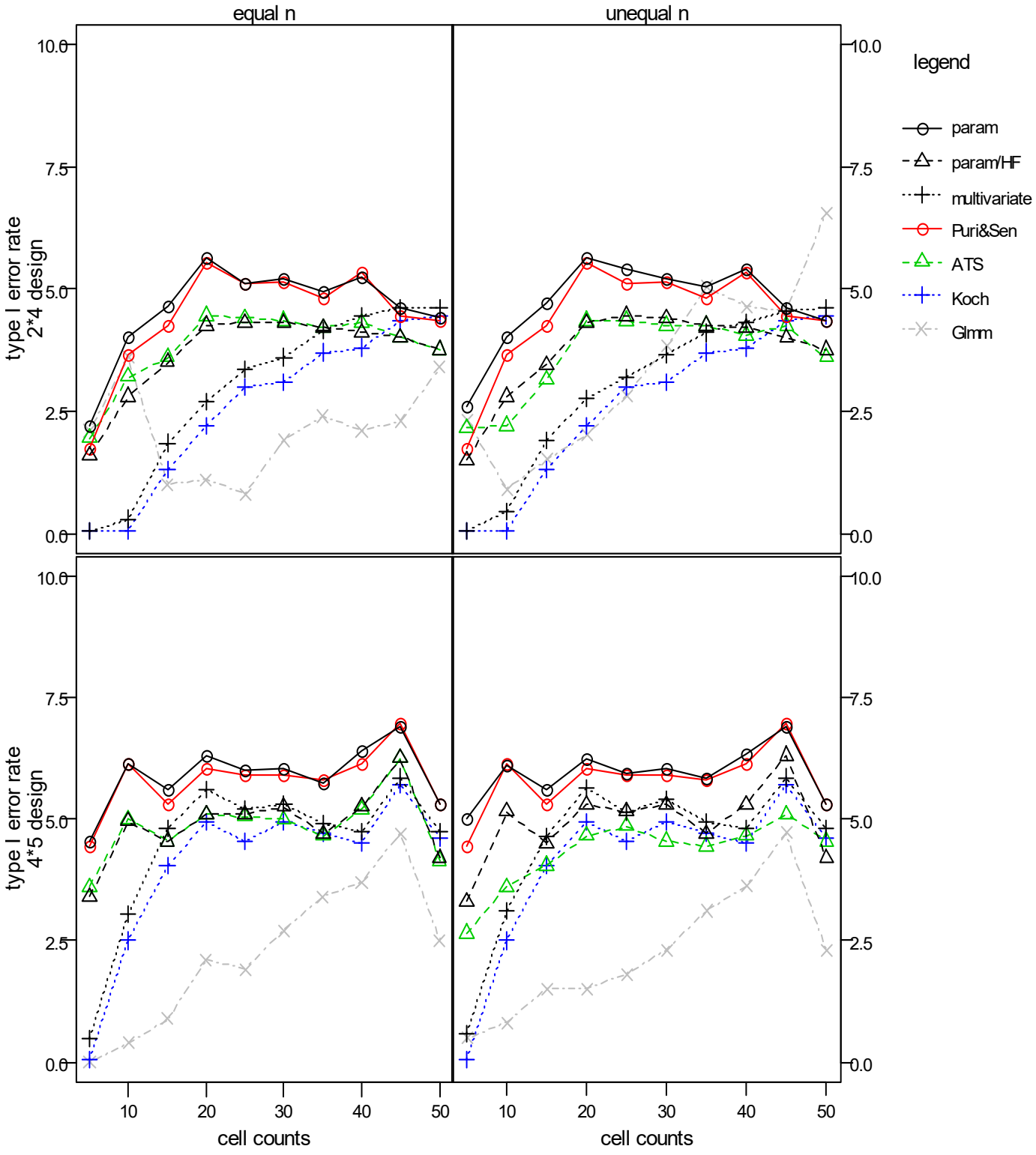
3. 4. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.05	4.65	4.75	5.25	5.45	6.00	4.50	3.45	5.00	4.75	5.45	5.40	5.95	4.50
	par./ HF-corr.	2.70	4.05	4.25	4.25	4.95	5.50	4.35	2.80	4.15	4.20	4.60	4.80	5.50	4.35
	multivariate	0.25	2.35	3.20	4.40	5.05	4.65	4.95	0.75	2.20	2.95	4.45	5.20	4.65	4.90
	Puri & Sen	2.60	4.40	4.45	5.20	5.25	5.85	4.50	2.60	4.40	4.45	5.20	5.25	5.85	4.50
	ATS	3.40	4.10	4.35	4.35	4.95	5.55	4.35	2.55	3.55	3.85	4.50	4.95	5.00	5.00
	Koch	0.05	1.00	2.15	3.90	4.85	4.45	4.70	0.05	1.00	2.15	3.90	4.85	4.45	4.70
	GLMM	1.60	0.70	0.90	2.30	3.70	4.50	6.00	0.00	1.20	2.80	3.60	5.00	5.30	4.60
4*5	parametric	4.95	5.70	5.75	6.30	6.20	6.05	6.60	4.95	5.65	5.50	6.30	6.10	6.05	6.60
	par./ HF-corr.	4.05	4.80	5.10	5.40	5.20	5.20	5.70	4.10	4.65	5.15	5.30	5.15	5.10	5.65
	multivariate	2.15	3.70	4.65	5.40	5.45	5.75	5.20	2.20	3.65	4.65	5.50	5.45	5.75	5.20
	Puri & Sen	4.55	5.45	5.45	6.20	6.15	5.95	6.55	4.55	5.45	5.45	6.20	6.15	5.95	6.55
	ATS	4.00	4.60	5.10	5.25	5.20	5.20	5.60	4.10	4.50	5.65	4.50	5.55	5.50	5.15
	Koch	0.60	2.85	4.25	5.10	5.10	5.55	5.05	0.60	2.85	4.25	5.10	5.10	5.55	5.05
	GLMM	0.10	1.50	3.50	5.20	5.90	5.80	7.50	0.40	0.50	1.10	3.00	5.40	6.20	6.20


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

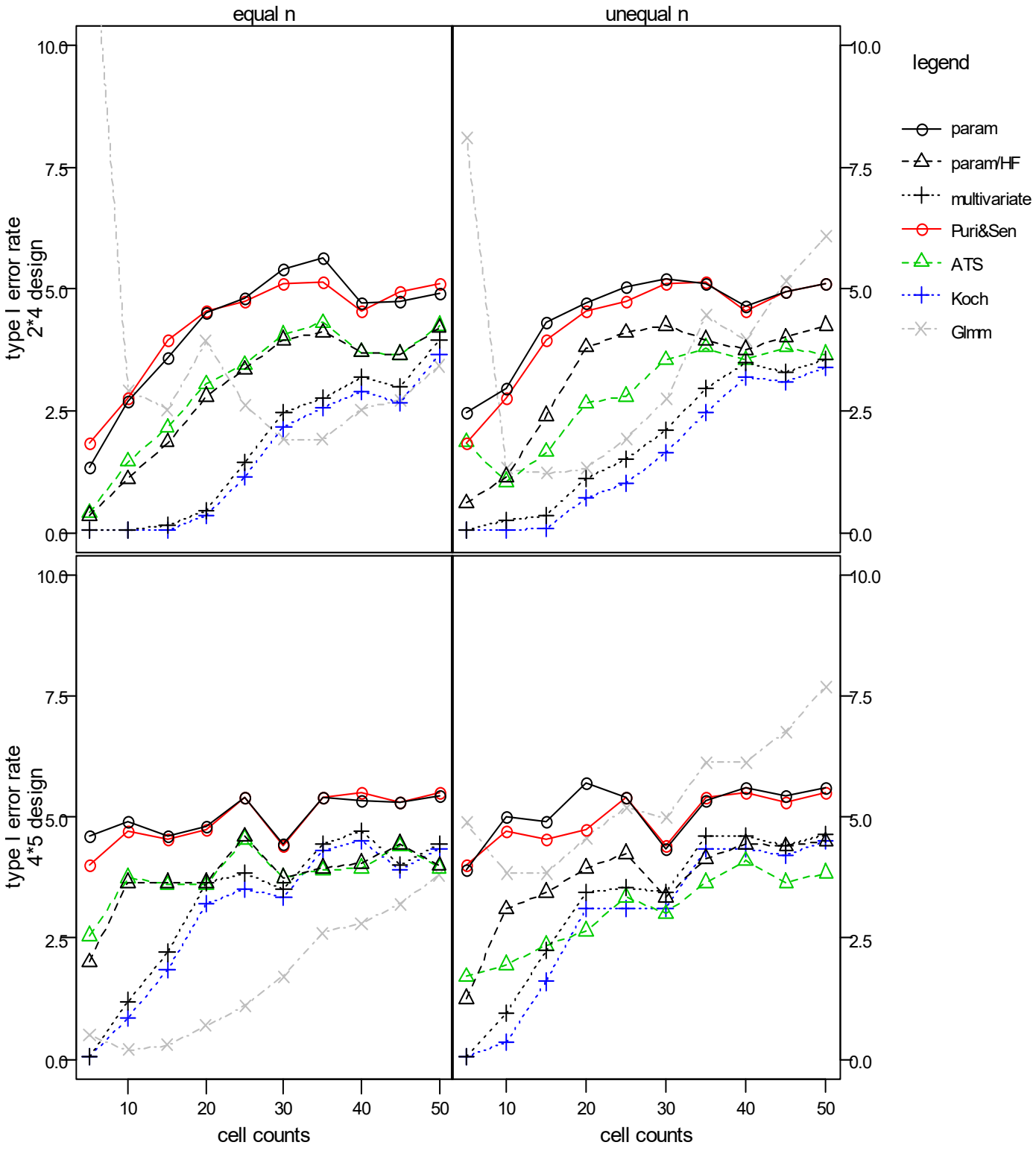
3. 4. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	2.20	4.00	4.65	5.65	5.20	5.25	4.40	2.60	4.00	4.70	5.65	5.20	5.40	4.35
	par./ HF-corr.	1.60	2.80	3.50	4.25	4.30	4.10	3.75	1.50	2.80	3.45	4.30	4.40	4.20	3.75
	multivariate	0.05	0.30	1.85	2.70	3.60	4.45	4.60	0.05	0.45	1.90	2.75	3.65	4.30	4.60
	Puri & Sen	1.75	3.65	4.25	5.55	5.15	5.35	4.35	1.75	3.65	4.25	5.55	5.15	5.35	4.35
	ATS	1.95	3.20	3.60	4.45	4.35	4.30	3.75	2.15	2.20	3.15	4.35	4.25	4.05	3.60
	Koch	0.05	0.05	1.30	2.20	3.10	3.80	4.45	0.05	0.05	1.30	2.20	3.10	3.80	4.45
	GLMM	2.10	3.60	1.00	1.10	1.90	2.10	3.40	2.32	0.91	1.51	2.02	3.83	4.64	6.55
4*5	parametric	4.55	6.15	5.60	6.30	6.05	6.40	5.30	5.00	6.10	5.60	6.25	6.05	6.35	5.30
	par./ HF-corr.	3.40	4.95	4.55	5.10	5.25	5.25	4.20	3.30	5.15	4.50	5.30	5.30	5.30	4.20
	multivariate	0.50	3.05	4.80	5.60	5.30	4.75	4.75	0.60	3.10	4.65	5.65	5.40	4.80	4.80
	Puri & Sen	4.45	6.15	5.30	6.05	5.90	6.15	5.30	4.45	6.15	5.30	6.05	5.90	6.15	5.30
	ATS	3.60	5.00	4.55	5.10	5.00	5.20	4.15	2.65	3.60	4.05	4.65	4.55	4.65	4.55
	Koch	0.05	2.50	4.05	4.95	4.95	4.50	4.60	0.05	2.50	4.05	4.95	4.95	4.50	4.60
	GLMM	0.00	0.40	0.90	2.10	2.70	3.70	2.50	0.50	0.80	1.51	1.51	2.31	3.61	2.31


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 4. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	1.35	2.70	3.60	4.50	5.40	4.70	4.90	2.45	2.95	4.30	4.70	5.20	4.65	5.10
	par./ HF-corr.	0.35	1.10	1.85	2.80	3.95	3.70	4.20	0.60	1.15	2.40	3.80	4.25	3.75	4.25
	multivariate	0.05	0.05	0.15	0.45	2.45	3.20	3.95	0.05	0.25	0.35	1.10	2.10	3.50	3.55
	Puri & Sen	1.85	2.75	3.95	4.55	5.10	4.55	5.10	1.85	2.75	3.95	4.55	5.10	4.55	5.10
	ATS	0.40	1.45	2.15	3.05	4.05	3.70	4.25	1.85	1.05	1.65	2.65	3.55	3.55	3.65
	Koch	0.05	0.05	0.05	0.35	2.15	2.90	3.65	0.05	0.05	0.10	0.70	1.65	3.20	3.40
	GLMM	13.38	2.92	2.52	3.92	1.91	2.52	3.42	8.10	1.32	1.21	1.32	2.73	3.95	6.07
4*5	parametric	4.60	4.90	4.60	4.80	4.45	5.35	5.45	3.90	5.00	4.90	5.70	4.35	5.60	5.60
	par./ HF-corr.	2.00	3.65	3.65	3.65	3.75	4.05	4.00	1.25	3.10	3.45	3.95	3.35	4.45	4.50
	multivariate	0.05	1.20	2.20	3.65	3.50	4.70	4.45	0.05	0.95	2.25	3.45	3.45	4.60	4.65
	Puri & Sen	4.00	4.70	4.55	4.75	4.40	5.50	5.50	4.00	4.70	4.55	4.75	4.40	5.50	5.50
	ATS	2.55	3.75	3.60	3.60	3.75	3.95	3.95	1.70	1.95	2.35	2.65	3.00	4.10	3.85
	Koch	0.05	0.85	1.85	3.20	3.35	4.50	4.35	0.05	0.35	1.60	3.10	3.10	4.35	4.50
	GLMM	0.50	0.20	0.30	0.70	1.70	2.81	3.81	4.88	3.84	3.84	4.57	4.98	6.13	7.68

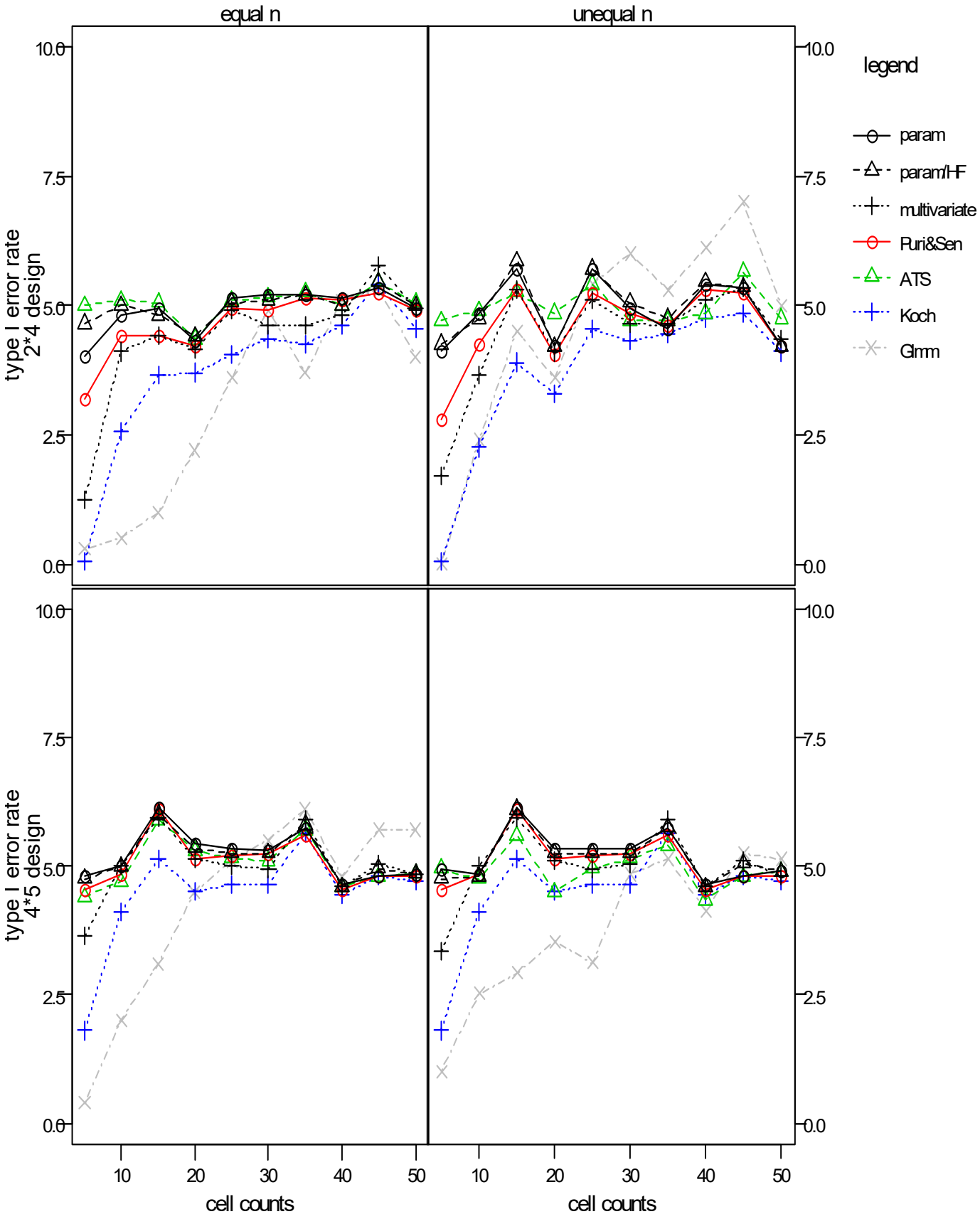

equal n
unequal n
type I error rate
2*4 design
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 5. Main effect B - A significant (effects a_i = 0.6*s) n_i and p_i independent

3. 5. 1. equal correlations on B (r=0.3)

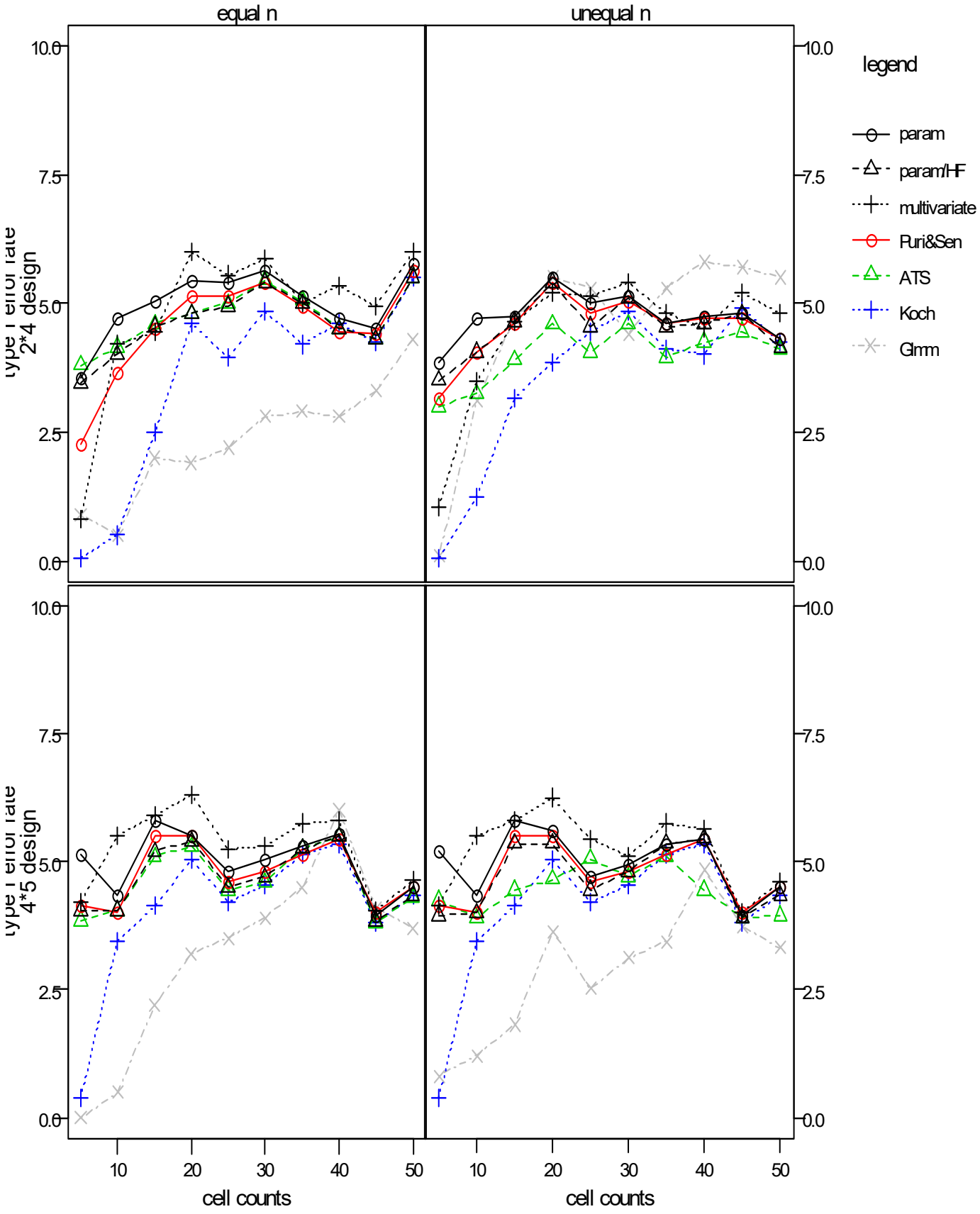
3. 5. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	4.00	4.80	4.95	4.30	5.20	5.15	4.95	4.10	4.85	5.70	4.20	4.95	5.40	4.20
	par./ HF-corr.	4.65	5.00	4.80	4.40	5.10	5.00	5.00	4.25	4.75	5.85	4.20	5.05	5.45	4.20
	multivariate	1.25	4.10	4.40	4.15	4.60	4.80	4.95	1.70	3.65	5.30	4.10	4.65	5.10	4.35
	Puri & Sen	3.20	4.40	4.40	4.20	4.90	5.10	4.90	2.80	4.25	5.30	4.05	4.85	5.30	4.20
	ATS	5.00	5.10	5.05	4.35	5.15	5.00	5.05	4.70	4.90	5.25	4.85	4.70	4.85	4.75
	Koch	0.05	2.55	3.65	3.70	4.35	4.60	4.55	0.05	2.25	3.90	3.30	4.30	4.75	4.10
	GLMM	0.30	0.50	1.00	2.20	4.90	5.10	4.00	0.00	2.40	4.50	3.60	6.00	6.10	5.00
4*5	parametric	4.80	5.00	6.15	5.45	5.30	4.65	4.85	4.95	4.85	6.15	5.35	5.35	4.65	4.90
	par./ HF-corr.	4.75	5.00	6.00	5.35	5.25	4.60	4.85	4.75	4.80	6.10	5.25	5.25	4.60	4.90
	multivariate	3.65	5.00	5.95	5.15	4.95	4.60	4.85	3.35	5.00	5.95	5.10	5.05	4.60	4.80
	Puri & Sen	4.55	4.85	6.10	5.15	5.25	4.55	4.80	4.55	4.85	6.10	5.15	5.25	4.55	4.80
	ATS	4.40	4.70	5.90	5.30	5.10	4.60	4.85	4.95	4.75	5.60	4.50	5.15	4.35	4.90
	Koch	1.80	4.10	5.15	4.50	4.65	4.45	4.70	1.80	4.10	5.15	4.50	4.65	4.45	4.70
	GLMM	0.40	2.00	3.10	4.50	5.50	4.80	5.70	1.01	2.52	2.92	3.53	4.84	4.13	5.14


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

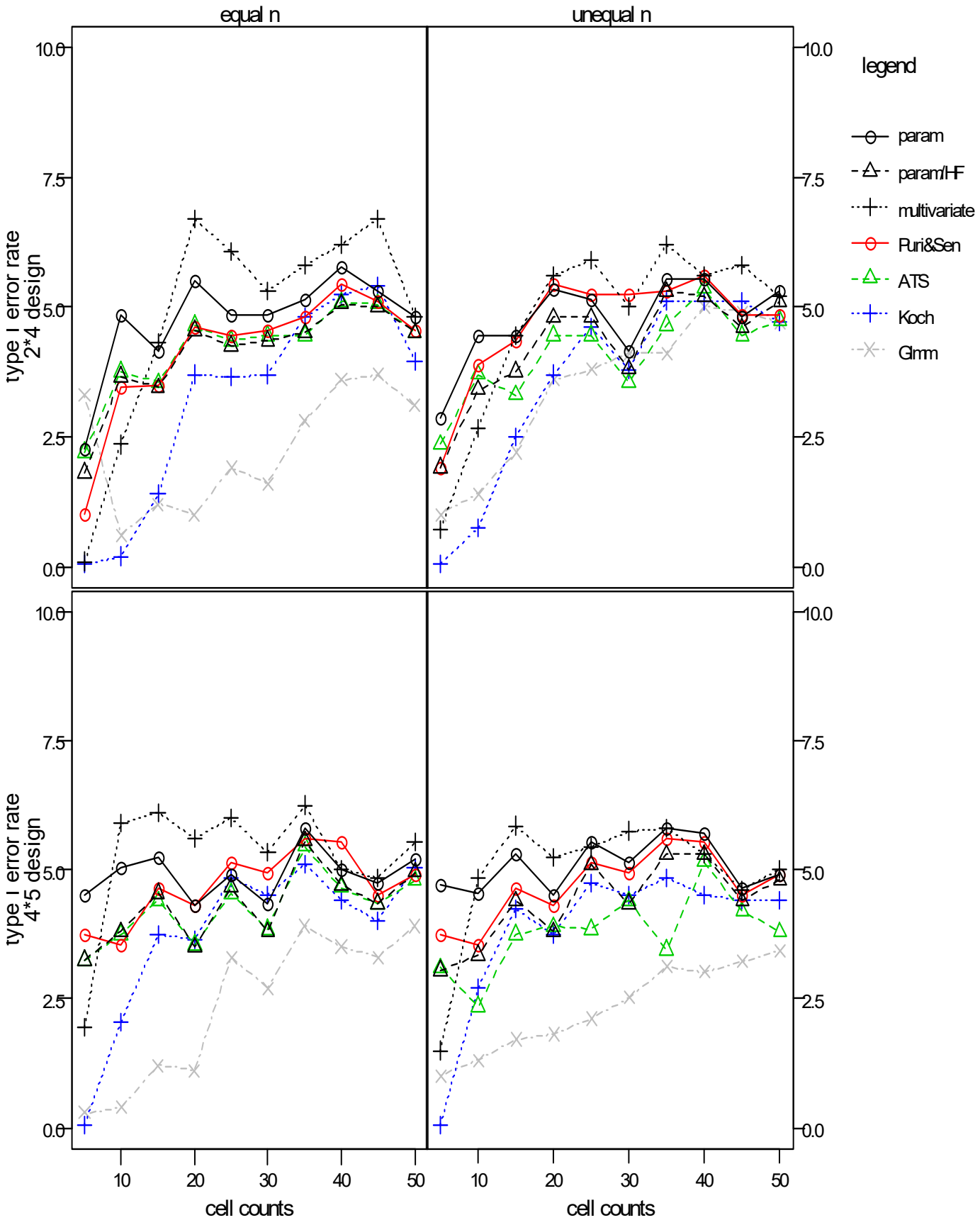
3. 5. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.55	4.70	5.05	5.45	5.65	4.70	5.75	3.85	4.70	4.75	5.50	5.15	4.75	4.30
	par./ HF-corr.	3.45	4.00	4.55	4.80	5.40	4.50	5.50	3.50	4.05	4.65	5.40	5.10	4.60	4.15
	multivariate	0.80	4.20	4.45	6.00	5.85	5.35	6.00	1.05	3.50	4.65	5.20	5.40	4.50	4.80
	Puri & Sen	2.25	3.65	4.50	5.15	5.40	4.45	5.65	3.15	4.05	4.60	5.40	5.05	4.70	4.30
	ATS	3.80	4.15	4.60	4.80	5.45	4.50	5.50	3.00	3.25	3.90	4.60	4.60	4.25	4.10
	Koch	0.05	0.50	2.50	4.60	4.85	4.60	5.50	0.05	1.25	3.15	3.85	4.85	4.00	4.25
	GLMM	0.90	0.50	2.00	1.90	2.80	2.80	4.30	0.10	3.10	4.70	5.50	4.40	5.80	5.50
4*5	parametric	5.15	4.35	5.80	5.50	5.05	5.55	4.50	5.20	4.35	5.80	5.60	4.95	5.45	4.50
	par./ HF-corr.	4.05	4.05	5.20	5.40	4.70	5.50	4.35	3.95	4.00	5.35	5.35	4.80	5.45	4.35
	multivariate	4.20	5.50	5.90	6.30	5.30	5.80	4.65	4.15	5.50	5.80	6.25	5.10	5.65	4.60
	Puri & Sen	4.15	4.00	5.50	5.50	4.80	5.45	4.50	4.15	4.00	5.50	5.50	4.80	5.45	4.50
	ATS	3.85	4.05	5.10	5.30	4.60	5.50	4.30	4.25	3.90	4.45	4.65	4.70	4.45	3.95
	Koch	0.40	3.45	4.15	5.05	4.55	5.35	4.35	0.40	3.45	4.15	5.05	4.55	5.35	4.35
	GLMM	0.00	0.50	2.20	3.20	3.90	6.00	3.70	0.81	1.21	1.81	3.63	3.12	4.84	3.33


equal n
unequal n
Type I error rate
2*4 design
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 5. 1. 3 p = 0.9

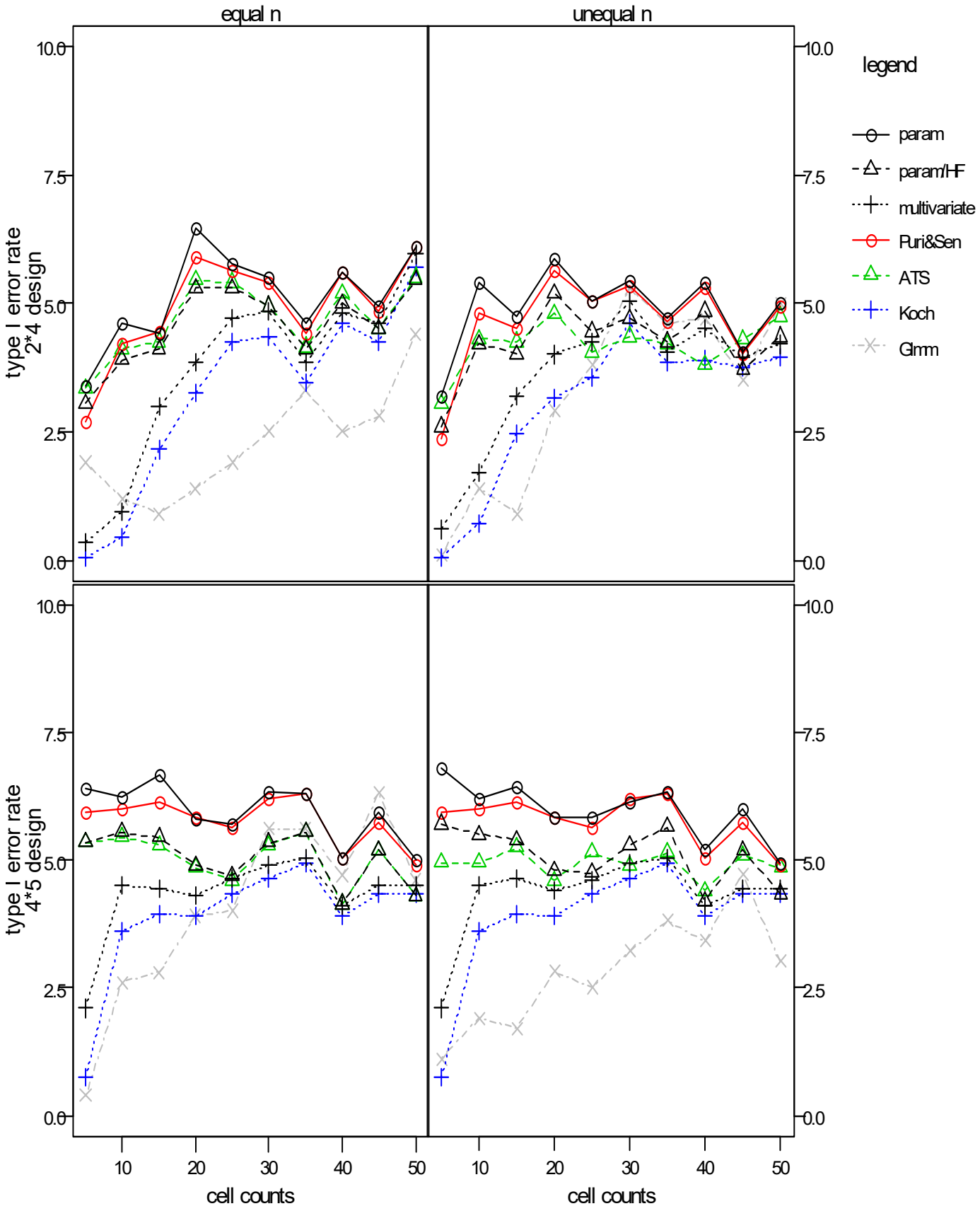
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	2.25	4.85	4.15	5.50	4.85	5.75	4.80	2.85	4.45	4.45	5.35	4.15	5.55	5.30
	par./ HF-corr.	1.80	3.65	3.45	4.55	4.35	5.05	4.50	1.90	3.40	3.75	4.80	3.80	5.20	5.10
	multivariate	0.10	2.35	4.30	6.70	5.30	6.20	4.80	0.70	2.65	4.45	5.60	5.00	5.60	5.20
	Puri & Sen	1.00	3.45	3.50	4.60	4.55	5.45	4.55	1.90	3.90	4.35	5.45	5.25	5.60	4.85
	ATS	2.20	3.75	3.55	4.65	4.45	5.10	4.50	2.35	3.70	3.30	4.45	3.55	5.35	4.75
	Koch	0.05	0.20	1.40	3.70	3.70	5.25	3.95	0.05	0.75	2.50	3.70	3.80	5.10	4.70
	GLMM	3.30	0.60	1.20	1.00	1.60	3.60	3.10	1.00	1.40	2.20	3.60	4.10	5.00	4.70
4*5	parametric	4.50	5.05	5.25	4.30	4.35	5.00	5.20	4.70	4.55	5.30	4.50	5.15	5.70	4.90
	par./ HF-corr.	3.25	3.80	4.55	3.50	3.80	4.70	4.95	3.05	3.35	4.40	3.80	4.35	5.30	4.80
	multivariate	1.95	5.90	6.10	5.60	5.35	5.00	5.55	1.50	4.85	5.85	5.25	5.75	5.30	5.00
	Puri & Sen	3.75	3.55	4.65	4.30	4.95	5.55	4.90	3.75	3.55	4.65	4.30	4.95	5.55	4.90
	ATS	3.25	3.75	4.40	3.55	3.85	4.65	4.80	3.10	2.35	3.75	3.90	4.40	5.15	3.80
	Koch	0.05	2.05	3.75	3.65	4.50	4.40	5.05	0.05	2.70	4.25	3.75	4.50	4.50	4.40
	GLMM	0.30	0.40	1.20	1.10	2.71	3.51	3.91	1.01	1.31	1.71	1.81	2.52	3.02	3.43


equal n
unequal n
type I error rate
2*4 design
4*5 design
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm
0.0
2.5
5.0
7.5
10.0
10
20
30
40
50

3. 5. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

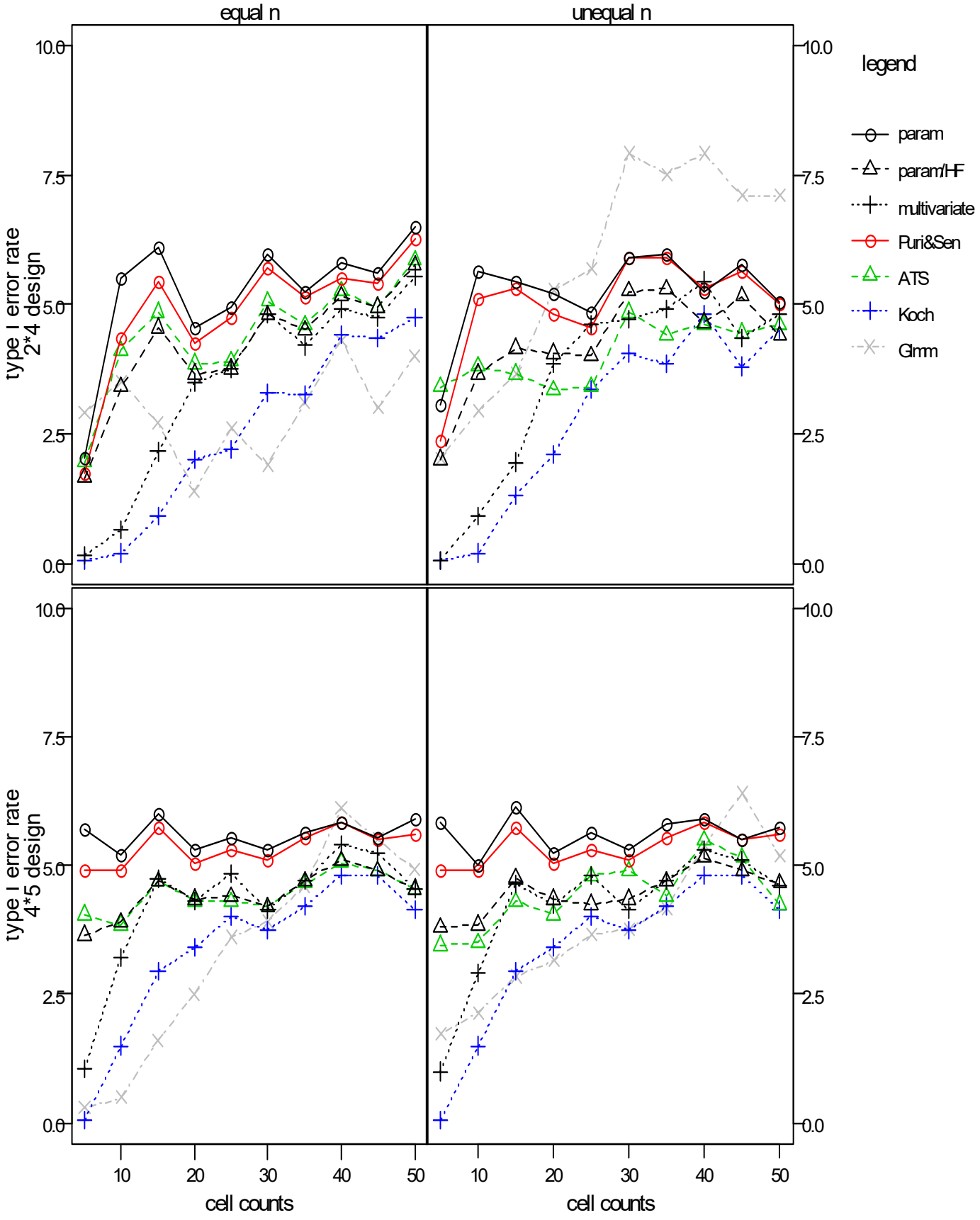
3. 5. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.40	4.60	4.40	6.45	5.50	5.60	6.10	3.20	5.40	4.75	5.85	5.45	5.40	5.00
	par./ HF-corr.	3.05	3.90	4.10	5.30	4.95	5.00	5.45	2.60	4.20	4.00	5.20	4.70	4.85	4.35
	multivariate	0.35	0.95	3.00	3.85	4.85	4.80	5.95	0.60	1.70	3.20	4.00	5.05	4.50	4.20
	Puri & Sen	2.70	4.20	4.45	5.90	5.40	5.60	6.10	2.35	4.80	4.50	5.65	5.35	5.30	4.95
	ATS	3.35	4.10	4.25	5.45	4.95	5.20	5.50	3.05	4.30	4.25	4.80	4.35	3.80	4.75
	Koch	0.05	0.45	2.15	3.25	4.35	4.60	5.70	0.05	0.70	2.45	3.15	4.60	3.90	3.95
	GLMM	1.90	1.20	0.90	1.40	2.50	2.50	4.40	0.10	1.40	0.90	2.90	5.30	4.70	5.00
4*5	parametric	6.40	6.25	6.65	5.80	6.35	5.05	5.00	6.80	6.20	6.45	5.85	6.15	5.20	4.95
	par./ HF-corr.	5.35	5.55	5.45	4.90	5.35	4.15	4.30	5.70	5.50	5.40	4.80	5.30	4.20	4.35
	multivariate	2.10	4.50	4.45	4.30	4.90	4.10	4.50	2.10	4.50	4.65	4.40	4.95	4.10	4.45
	Puri & Sen	5.95	6.00	6.15	5.85	6.20	5.05	4.90	5.95	6.00	6.15	5.85	6.20	5.05	4.90
	ATS	5.35	5.45	5.30	4.85	5.30	4.15	4.30	4.95	4.95	5.25	4.60	4.90	4.40	4.85
	Koch	0.75	3.60	3.95	3.90	4.65	3.90	4.35	0.75	3.60	3.95	3.90	4.65	3.90	4.35
	GLMM	0.40	2.61	2.81	3.91	5.61	4.71	4.61	1.11	1.91	1.71	2.82	3.22	3.42	3.02


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

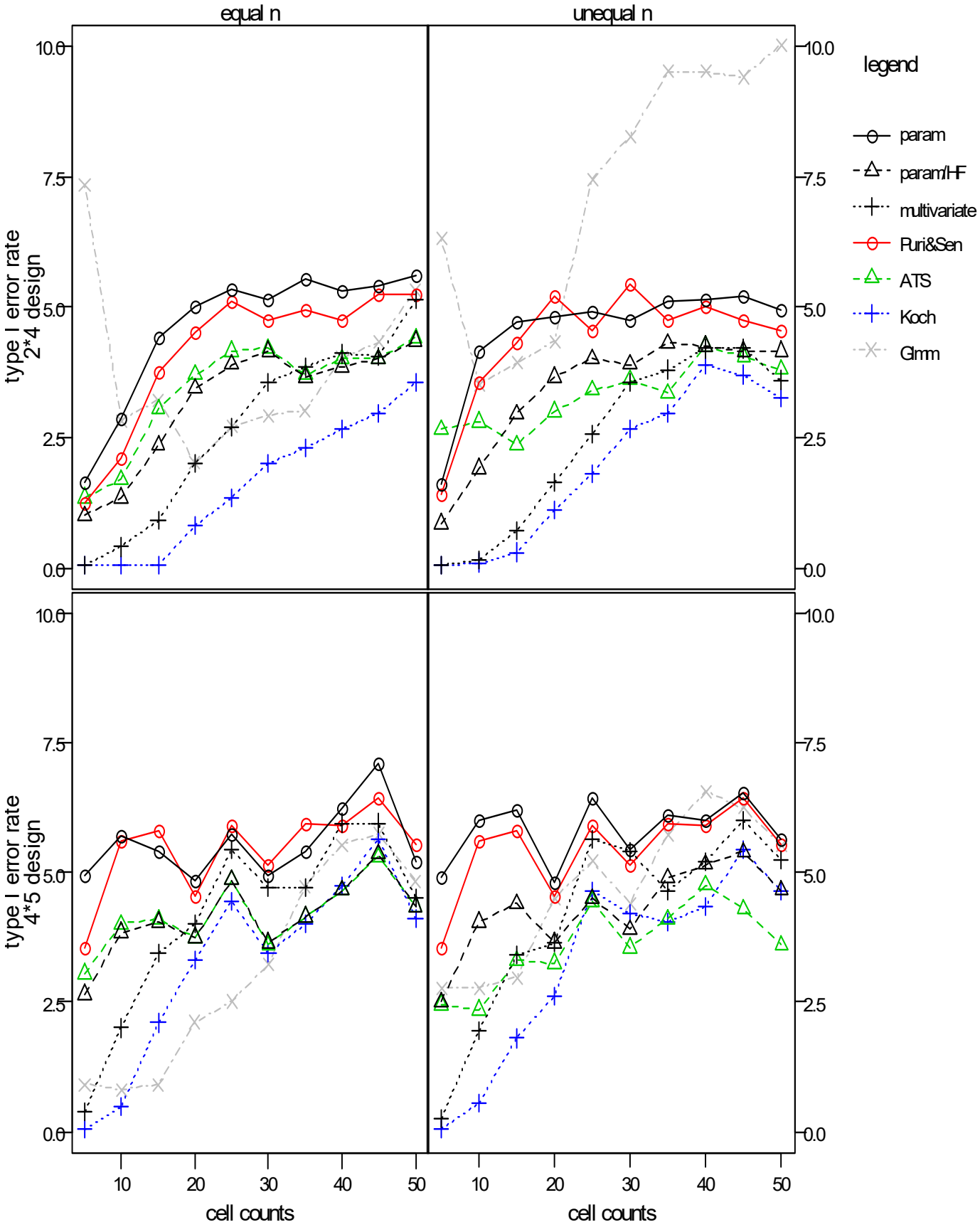
3. 5. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	2.05	5.50	6.10	4.55	5.95	5.80	6.50	3.05	5.65	5.45	5.20	5.90	5.25	5.05
	par./ HF-corr.	1.65	3.40	4.55	3.65	4.80	5.15	5.75	2.00	3.65	4.15	4.05	5.25	4.65	4.40
	multivariate	0.15	0.65	2.15	3.50	4.80	4.90	5.55	0.05	0.90	1.95	3.85	4.70	5.45	4.80
	Puri & Sen	1.75	4.35	5.45	4.25	5.70	5.50	6.25	2.35	5.10	5.30	4.80	5.90	5.30	5.00
	ATS	1.95	4.10	4.85	3.85	5.05	5.25	5.85	3.40	3.80	3.65	3.35	4.85	4.60	4.60
	Koch	0.05	0.20	0.90	2.00	3.30	4.40	4.75	0.05	0.20	1.30	2.10	4.05	4.80	4.50
	GLMM	2.91	3.51	2.71	1.40	1.90	4.31	4.01	2.03	2.94	3.65	5.27	7.91	7.91	7.10
4*5	parametric	5.70	5.20	6.00	5.30	5.30	5.85	5.90	5.85	5.00	6.15	5.25	5.30	5.90	5.75
	par./ HF-corr.	3.65	3.90	4.70	4.35	4.20	5.10	4.55	3.80	3.85	4.75	4.35	4.35	5.15	4.65
	multivariate	1.05	3.20	4.75	4.30	4.15	5.40	4.55	1.00	2.90	4.65	4.25	4.15	5.30	4.60
	Puri & Sen	4.90	4.90	5.75	5.05	5.10	5.85	5.60	4.90	4.90	5.75	5.05	5.10	5.85	5.60
	ATS	4.05	3.85	4.70	4.30	4.20	5.05	4.55	3.45	3.50	4.30	4.05	4.90	5.50	4.25
	Koch	0.05	1.50	2.95	3.40	3.75	4.80	4.15	0.05	1.50	2.95	3.40	3.75	4.80	4.15
	GLMM	0.30	0.50	1.60	2.51	3.91	6.11	4.91	1.73	2.13	2.85	3.15	3.76	5.39	5.18


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 5. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	1.65	2.85	4.40	5.00	5.15	5.30	5.60	1.60	4.15	4.70	4.80	4.75	5.15	4.95
	par./ HF-corr.	1.00	1.35	2.35	3.45	4.15	3.85	4.35	0.85	1.90	2.95	3.65	3.90	4.25	4.15
	multivariate	0.05	0.40	0.90	2.00	3.55	4.10	5.15	0.05	0.15	0.70	1.65	3.55	4.20	3.60
	Puri & Sen	1.25	2.10	3.75	4.50	4.75	4.75	5.25	1.40	3.55	4.30	5.20	5.45	5.00	4.55
	ATS	1.35	1.70	3.05	3.70	4.20	4.00	4.40	2.65	2.80	2.35	3.00	3.60	4.25	3.80
	Koch	0.05	0.05	0.05	0.80	2.00	2.65	3.55	0.05	0.10	0.30	1.10	2.65	3.90	3.25
	GLMM	7.33	2.81	3.21	2.01	2.91	4.02	5.32	6.30	3.51	3.93	4.34	8.26	9.50	10.02
4*5	parametric	4.95	5.70	5.40	4.85	4.95	6.25	5.20	4.90	6.00	6.20	4.80	5.45	6.00	5.65
	par./ HF-corr.	2.65	3.85	4.05	3.75	3.65	4.65	4.35	2.50	4.05	4.40	3.65	3.90	5.15	4.65
	multivariate	0.40	2.00	3.45	4.00	4.70	5.95	4.50	0.25	1.95	3.40	3.65	5.40	5.20	5.25
	Puri & Sen	3.55	5.60	5.80	4.55	5.15	5.90	5.55	3.55	5.60	5.80	4.55	5.15	5.90	5.55
	ATS	3.05	4.00	4.10	3.75	3.60	4.65	4.35	2.45	2.35	3.30	3.25	3.55	4.75	3.60
	Koch	0.05	0.50	2.10	3.30	3.45	4.75	4.10	0.05	0.55	1.80	2.60	4.20	4.35	4.65
	GLMM	0.91	0.80	0.91	2.11	3.22	5.53	4.83	2.76	2.76	2.97	4.50	4.40	6.55	5.53

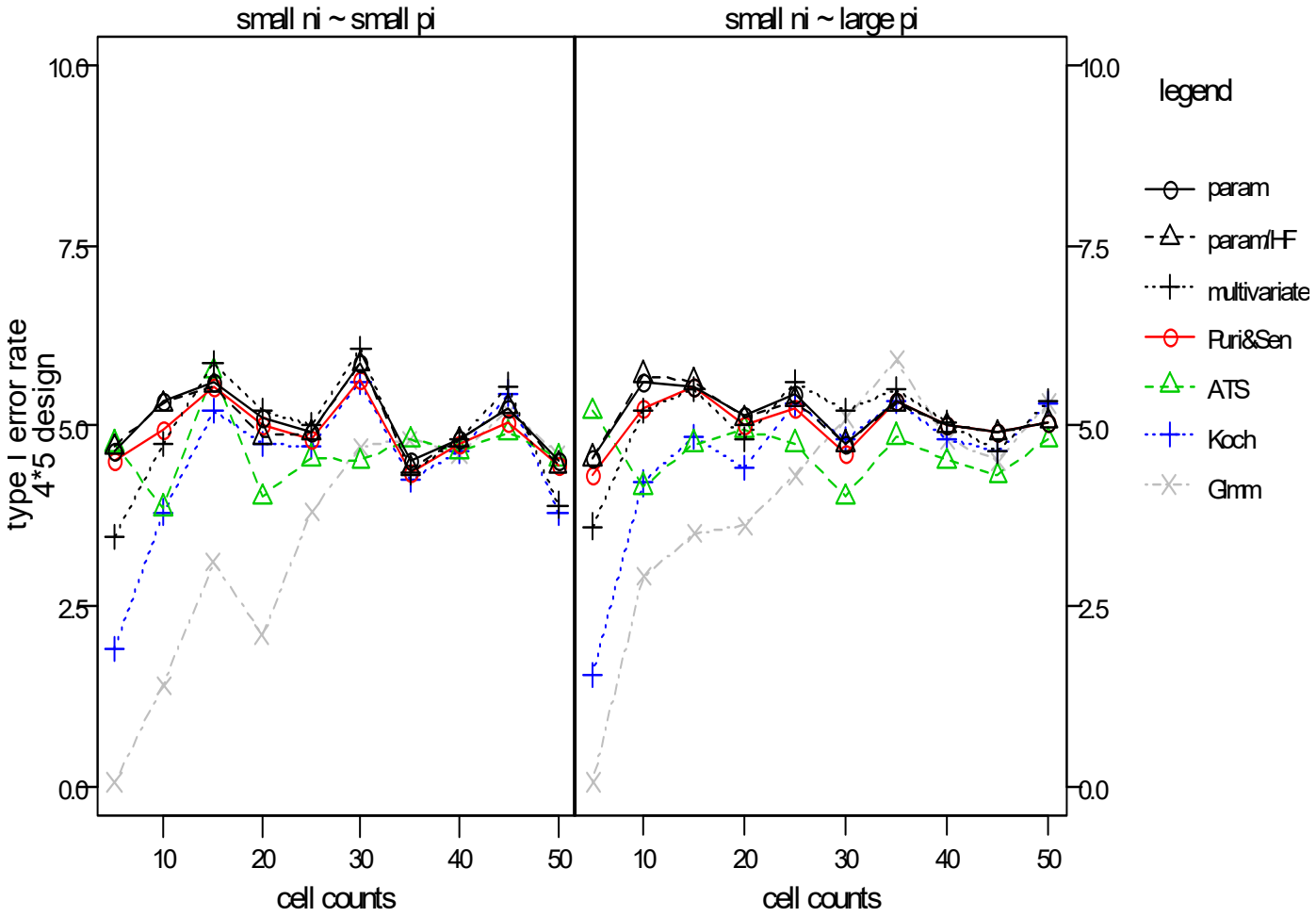

equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm
0.0
2.5
5.0
7.5
10.0
10
20
30
40
50

3. 6. Main effect B - A significant (effects a_i = 0.6*s) small n_i ~ small p_i and small n_i ~ large p_i

3. 6. 1. equal correlations on B (r=0.3)

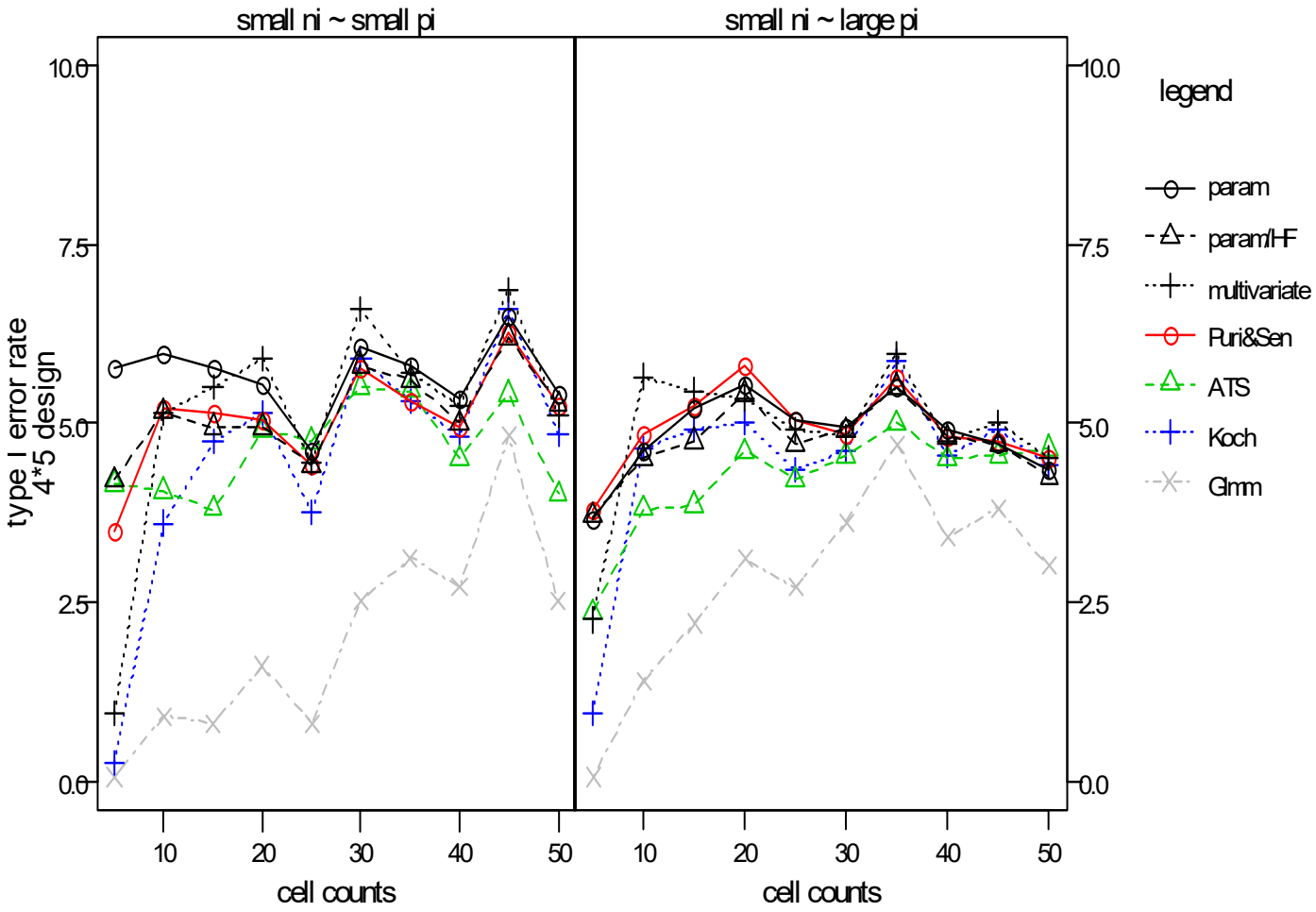
3. 6. 1. 1 p = 0.6

		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	4.65	5.35	5.60	5.10	5.85	4.80	4.50	4.55	5.60	5.55	5.15	4.75	5.00	5.05
	par./ HF-corr.	4.70	5.30	5.55	4.85	5.85	4.80	4.45	4.55	5.70	5.60	5.10	4.75	5.00	5.05
	multivariate	3.45	4.75	5.85	5.20	6.05	4.80	3.90	3.60	5.20	5.50	4.80	5.20	5.05	5.35
	Puri & Sen	4.50	4.95	5.55	5.00	5.65	4.75	4.45	4.30	5.25	5.55	5.00	4.60	5.00	5.05
	ATS	4.75	3.85	5.75	4.00	4.50	4.65	4.55	5.20	4.15	4.75	4.95	4.00	4.50	4.80
	Koch	1.90	3.80	5.20	4.75	5.60	4.65	3.80	1.55	4.20	4.85	4.40	4.80	4.80	5.30
	GLMM	0.05	1.40	3.10	2.10	4.70	4.60	4.60	0.05	2.90	3.50	3.60	5.11	4.80	5.31


small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

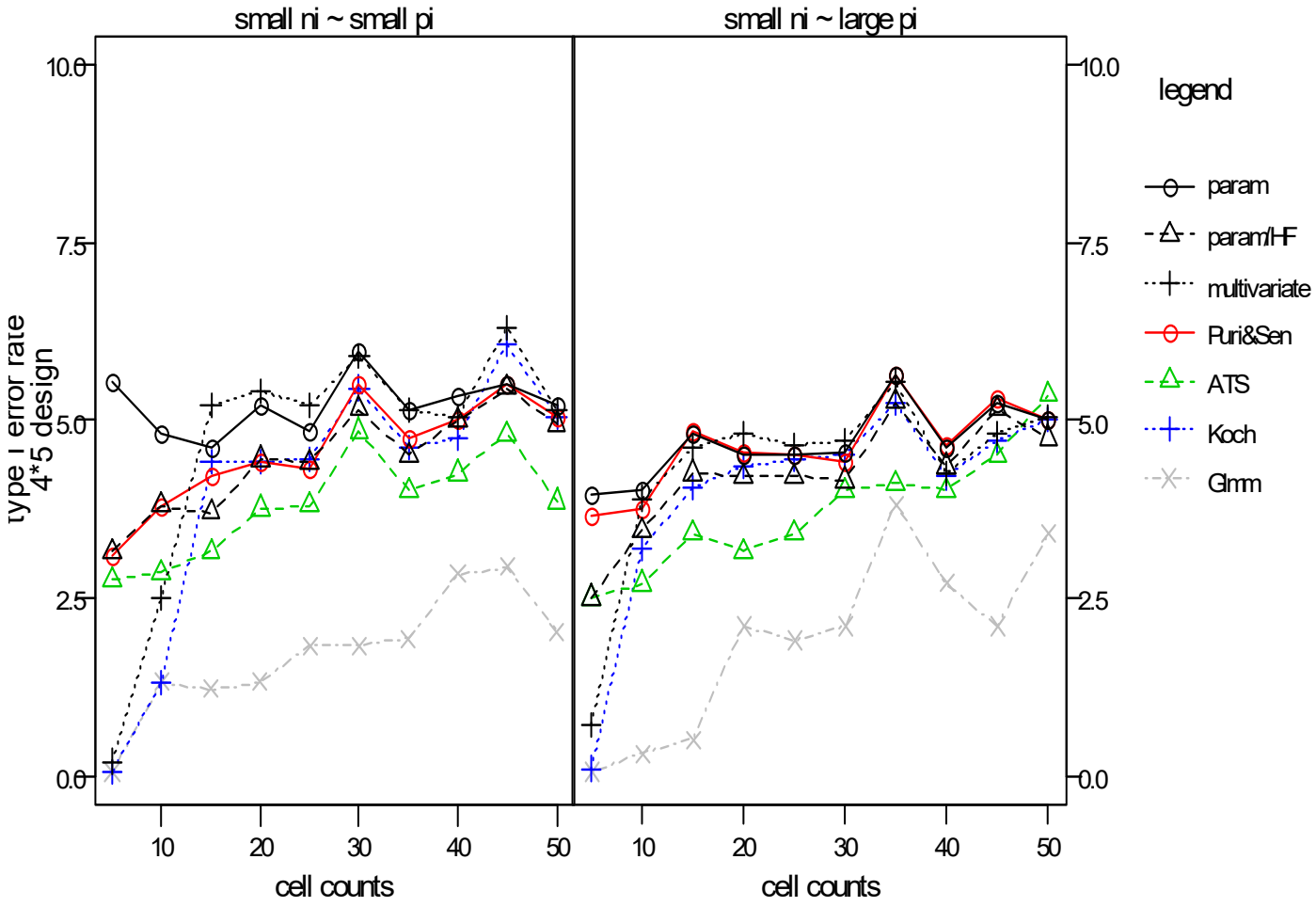
3. 6. 1. 2 p = 0.8

		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	5.75	5.95	5.75	5.55	6.05	5.35	5.40	3.65	4.60	5.20	5.55	4.95	4.90	4.35
	par./ HF-corr.	4.20	5.15	4.95	4.95	5.80	5.00	5.25	3.70	4.50	4.75	5.40	4.90	4.80	4.25
	multivariate	0.95	5.15	5.50	5.90	6.60	5.25	5.10	2.25	5.65	5.45	5.35	4.80	4.75	4.50
	Puri & Sen	3.50	5.20	5.15	5.05	5.75	4.95	5.25	3.80	4.85	5.25	5.80	4.85	4.80	4.50
	ATS	4.15	4.05	3.80	4.90	5.50	4.50	4.00	2.35	3.80	3.85	4.60	4.55	4.50	4.65
	Koch	0.25	3.60	4.75	5.15	5.90	4.80	4.85	0.95	4.65	4.90	5.00	4.60	4.55	4.40
	GLMM	0.05	0.90	0.80	1.61	2.51	2.71	2.51	0.05	1.40	2.20	3.10	3.60	3.40	3.00


small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 6. 1. 3 p = 0.9

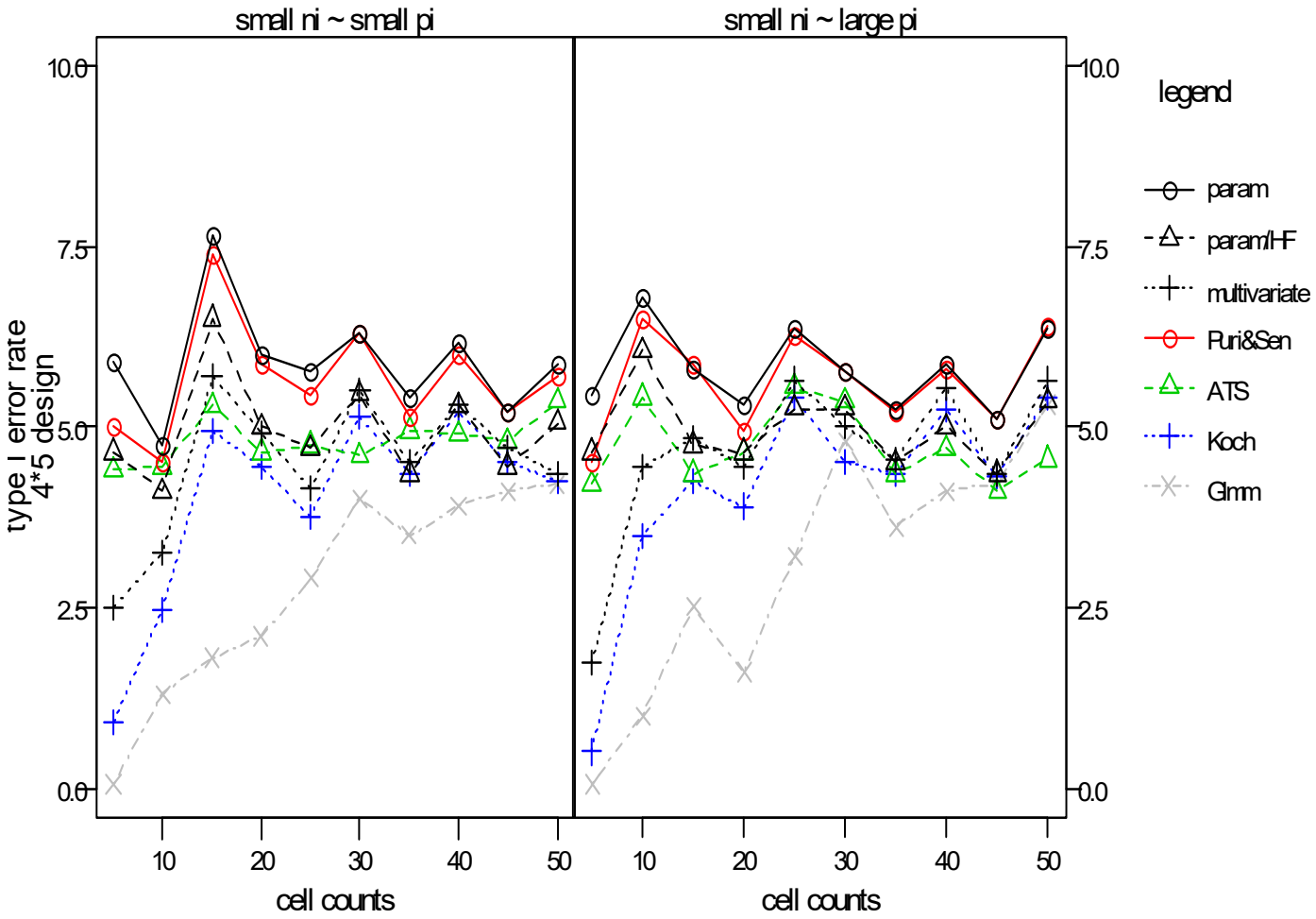
		unequal cell counts small n_i ~ large p_i							unequal cell counts small n_i ~ small p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	5.55	4.80	4.60	5.20	5.95	5.35	5.20	3.95	4.00	4.80	4.50	4.55	4.60	5.00
	par./ HF-corr.	3.15	3.80	3.70	4.45	5.15	5.00	4.95	2.50	3.45	4.25	4.20	4.15	4.35	4.75
	multivariate	0.20	2.50	5.20	5.40	5.90	5.05	5.15	0.70	3.90	4.60	4.80	4.70	4.25	5.05
	Puri & Sen	3.10	3.80	4.20	4.40	5.50	5.00	5.05	3.65	3.75	4.85	4.55	4.40	4.65	5.00
	ATS	2.75	2.85	3.15	3.75	4.85	4.25	3.85	2.50	2.70	3.40	3.15	4.00	4.00	5.35
	Koch	0.05	1.30	4.40	4.40	5.45	4.75	5.05	0.10	3.20	4.05	4.35	4.50	4.20	5.00
	GLMM	0.05	1.32	1.21	1.32	1.82	2.83	2.02	0.05	0.30	0.50	2.10	2.10	2.70	3.40


small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 6. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

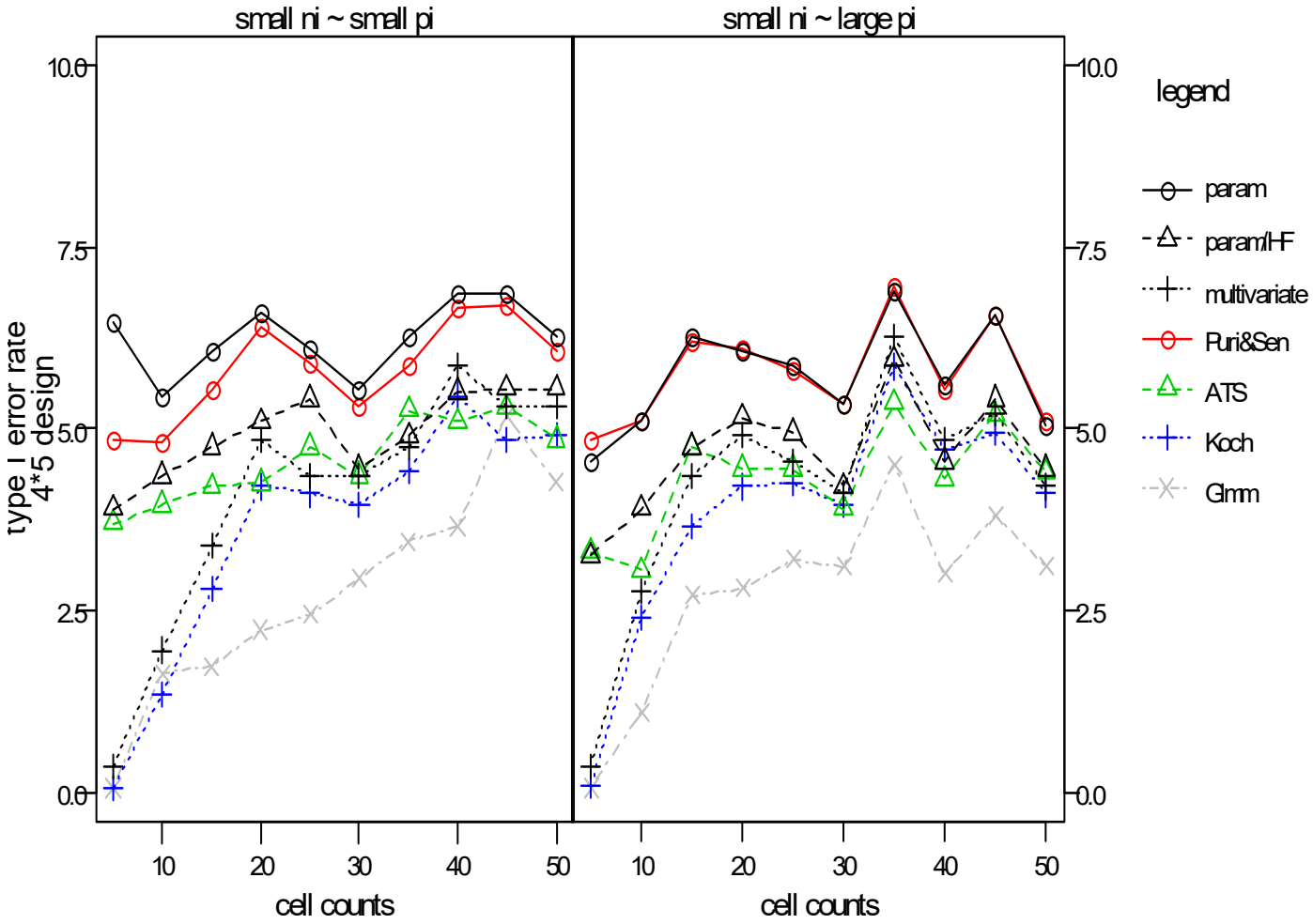
3. 6. 2. 1 p = 0.6

		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	5.90	4.75	7.65	6.00	6.30	6.15	5.85	5.45	6.80	5.80	5.30	5.75	5.85	6.35
	par./ HF-corr.	4.65	4.10	6.50	5.00	5.45	5.30	5.05	4.65	6.05	4.75	4.65	5.25	5.00	5.35
	multivariate	2.50	3.25	5.70	4.90	5.50	5.30	4.35	1.75	4.45	4.85	4.45	5.00	5.55	5.65
	Puri & Sen	5.00	4.50	7.40	5.85	6.30	6.00	5.70	4.50	6.50	5.85	4.95	5.75	5.80	6.40
	ATS	4.40	4.45	5.30	4.65	4.60	4.90	5.35	4.20	5.40	4.35	4.65	5.35	4.70	4.55
	Koch	0.90	2.45	4.95	4.45	5.15	5.20	4.25	0.50	3.50	4.25	3.90	4.50	5.25	5.40
	GLMMI	0.05	1.30	1.80	2.10	4.00	3.90	4.20	0.05	1.00	2.50	1.60	4.80	4.10	5.31


small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

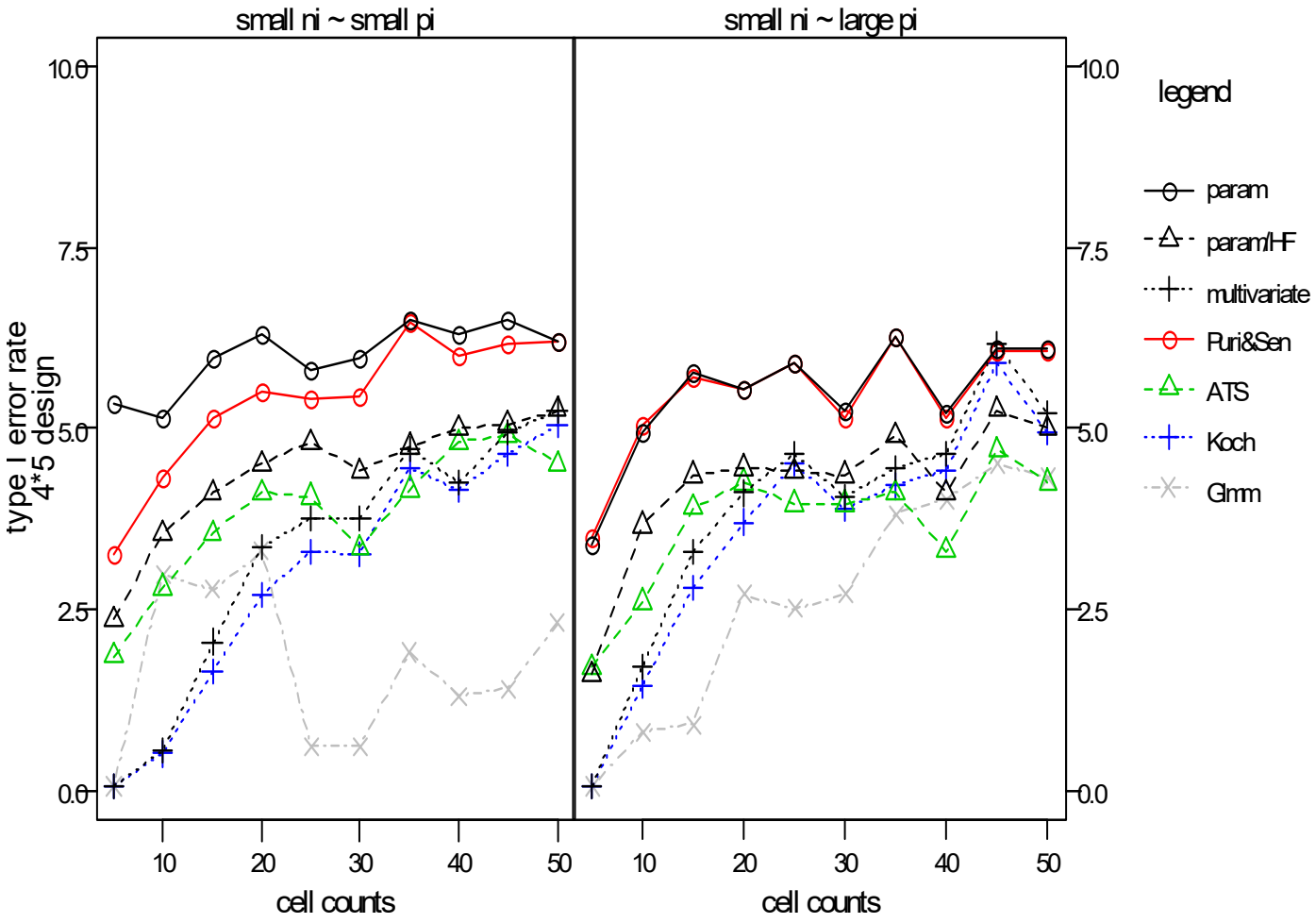
3. 6. 2. 2 p = 0.8

		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	6.45	5.45	6.05	6.60	5.55	6.85	6.25	4.55	5.10	6.25	6.05	5.35	5.60	5.05
	par./ HF-corr.	3.90	4.35	4.75	5.10	4.45	5.50	5.55	3.25	3.90	4.75	5.15	4.20	4.55	4.45
	multivariate	0.35	1.95	3.40	4.85	4.35	5.85	5.30	0.35	2.75	4.35	4.90	4.10	4.85	4.20
	Puri & Sen	4.85	4.80	5.55	6.40	5.30	6.65	6.05	4.85	5.10	6.20	6.10	5.35	5.55	5.10
	ATS	3.70	3.95	4.20	4.25	4.35	5.10	4.85	3.30	3.05	4.75	4.45	3.90	4.30	4.40
	Koch	0.05	1.35	2.80	4.20	3.95	5.45	4.90	0.10	2.40	3.65	4.20	3.95	4.70	4.10
	GLMM	0.05	1.62	1.72	2.23	2.94	3.65	4.26	0.05	1.10	2.70	2.80	3.10	3.00	3.10


small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 6. 2. 3 p = 0.9

		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	5.35	5.15	5.95	6.30	5.95	6.30	6.20	3.40	4.95	5.75	5.55	5.25	5.20	6.10
	par./ HF-corr.	2.35	3.55	4.10	4.50	4.40	5.00	5.25	1.60	3.65	4.35	4.45	4.35	4.10	5.00
	multivariate	0.05	0.55	2.05	3.35	3.75	4.25	5.25	0.05	1.70	3.30	4.10	4.05	4.65	5.20
	Puri & Sen	3.25	4.30	5.15	5.50	5.45	6.00	6.20	3.50	5.05	5.70	5.55	5.15	5.15	6.05
	ATS	1.85	2.80	3.55	4.10	3.35	4.80	4.50	1.70	2.60	3.90	4.25	3.95	3.30	4.25
	Koch	0.05	0.50	1.65	2.70	3.25	4.15	5.05	0.05	1.45	2.80	3.70	3.90	4.40	4.95
	GLMM	0.05	2.98	2.77	3.30	0.60	1.30	2.30	0.05	0.80	0.90	2.71	2.71	4.01	4.31

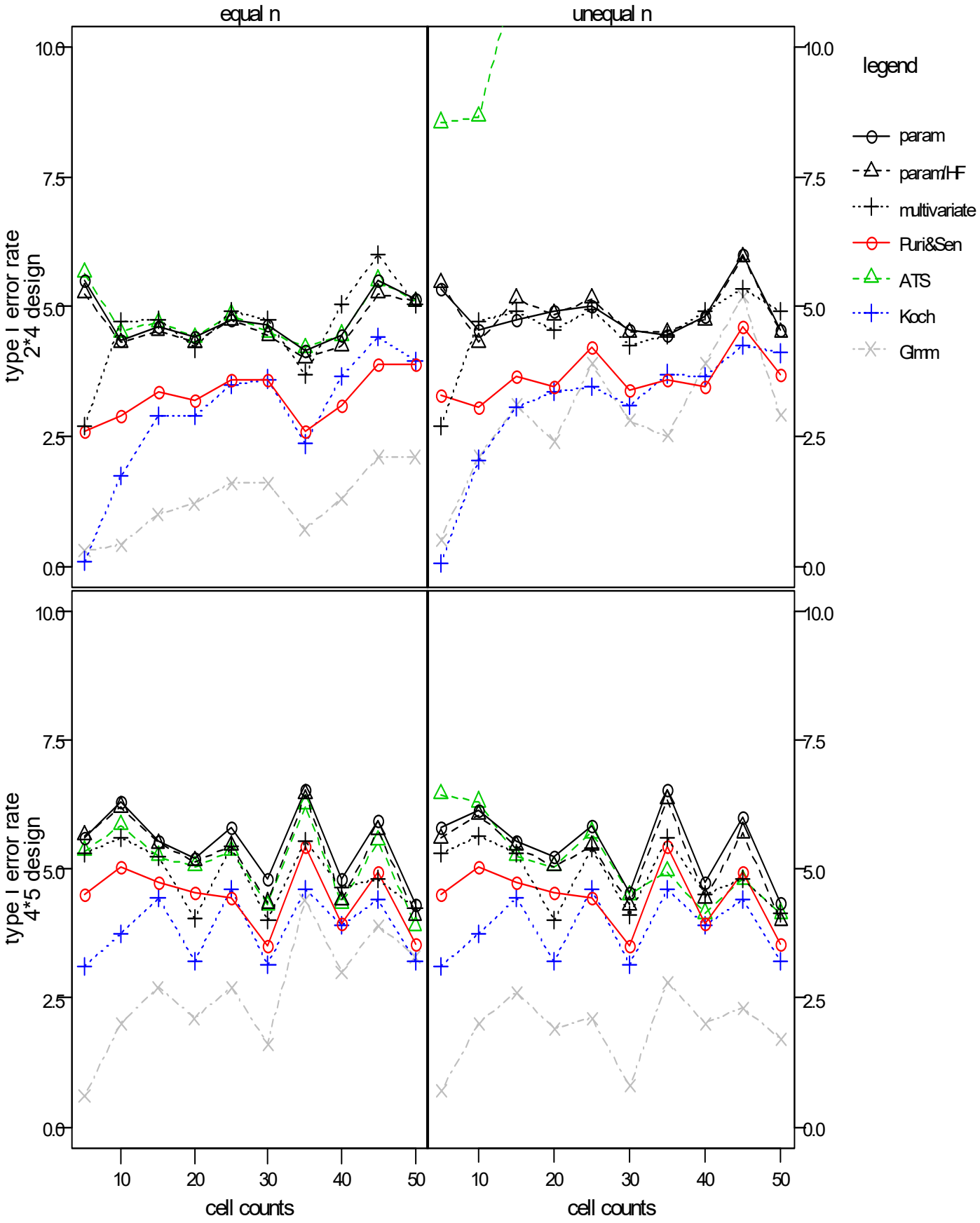

small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 7. Main effect B - Interaction significant (effects ab_{ij} = 0.6*s)

3. 7. 1. equal correlations on B (r=0.3)

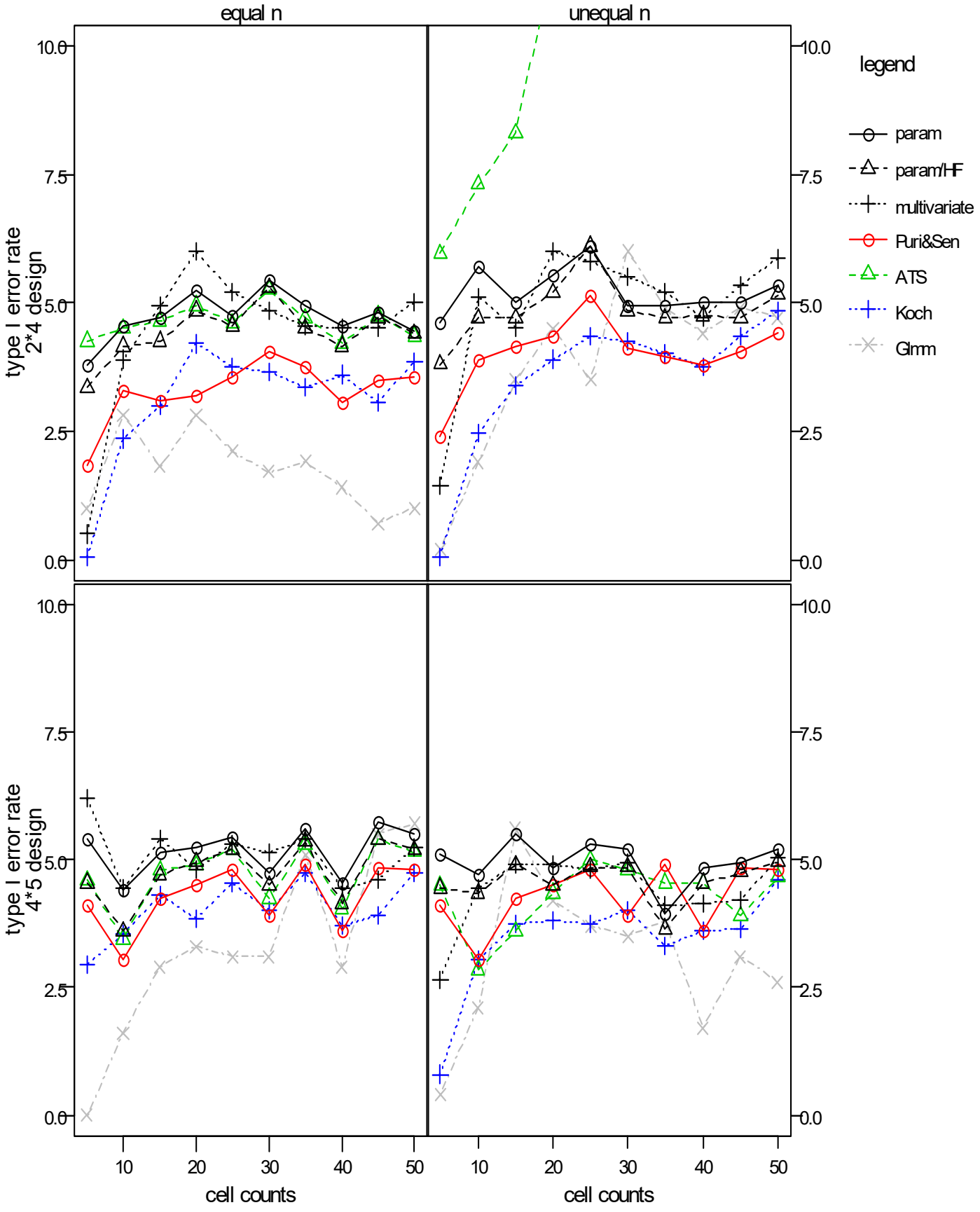
3. 7. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	5.50	4.35	4.60	4.40	4.65	4.45	5.15	5.35	4.55	4.75	4.90	4.55	4.80	4.55
	par./ HF-corr.	5.25	4.30	4.55	4.30	4.45	4.25	5.10	5.45	4.30	5.15	4.85	4.50	4.75	4.50
	multivariate	2.70	4.70	4.75	4.20	4.75	5.05	5.05	2.70	4.70	4.90	4.55	4.25	4.90	4.90
	Puri & Sen	2.60	2.90	3.35	3.20	3.60	3.10	3.90	3.30	3.05	3.65	3.45	3.40	3.45	3.70
	ATS	5.65	4.50	4.70	4.40	4.50	4.45	5.10	8.55	8.65	11.45	13.75	18.90	24.95	28.40
	ATS (uncorr.)								6.45	4.8	5.8	5.95	4.85	4.95	4.9
	Koch	0.10	1.75	2.90	2.90	3.60	3.65	3.95	0.05	2.05	3.05	3.35	3.10	3.65	4.10
	GLMM	0.30	0.40	1.00	1.20	1.60	1.30	2.10	0.50	2.10	3.10	2.40	2.80	3.90	2.90
4*5	parametric	5.60	6.30	5.55	5.20	4.80	4.80	4.30	5.80	6.15	5.55	5.25	4.55	4.75	4.35
	par./ HF-corr.	5.65	6.20	5.50	5.15	4.35	4.40	4.10	5.60	6.05	5.45	5.05	4.30	4.45	4.00
	multivariate	5.30	5.60	5.25	4.05	4.00	4.65	4.25	5.30	5.65	5.30	4.00	4.10	4.50	4.15
	Puri & Sen	4.50	5.05	4.75	4.55	3.50	3.95	3.55	4.50	5.05	4.75	4.55	3.50	3.95	3.55
	ATS	5.35	5.85	5.25	5.05	4.30	4.35	3.90	6.45	6.30	5.25	5.05	4.50	4.15	4.15
	ATS (uncorr.)								5.85	5.15	4.85	4.65	4.45	4.1	4.2
	Koch	3.10	3.75	4.45	3.20	3.15	3.90	3.20	3.10	3.75	4.45	3.20	3.15	3.90	3.20
	GLMM	0.60	2.00	2.70	2.10	1.60	3.00	3.30	0.70	2.00	2.60	1.90	0.80	2.00	1.70


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

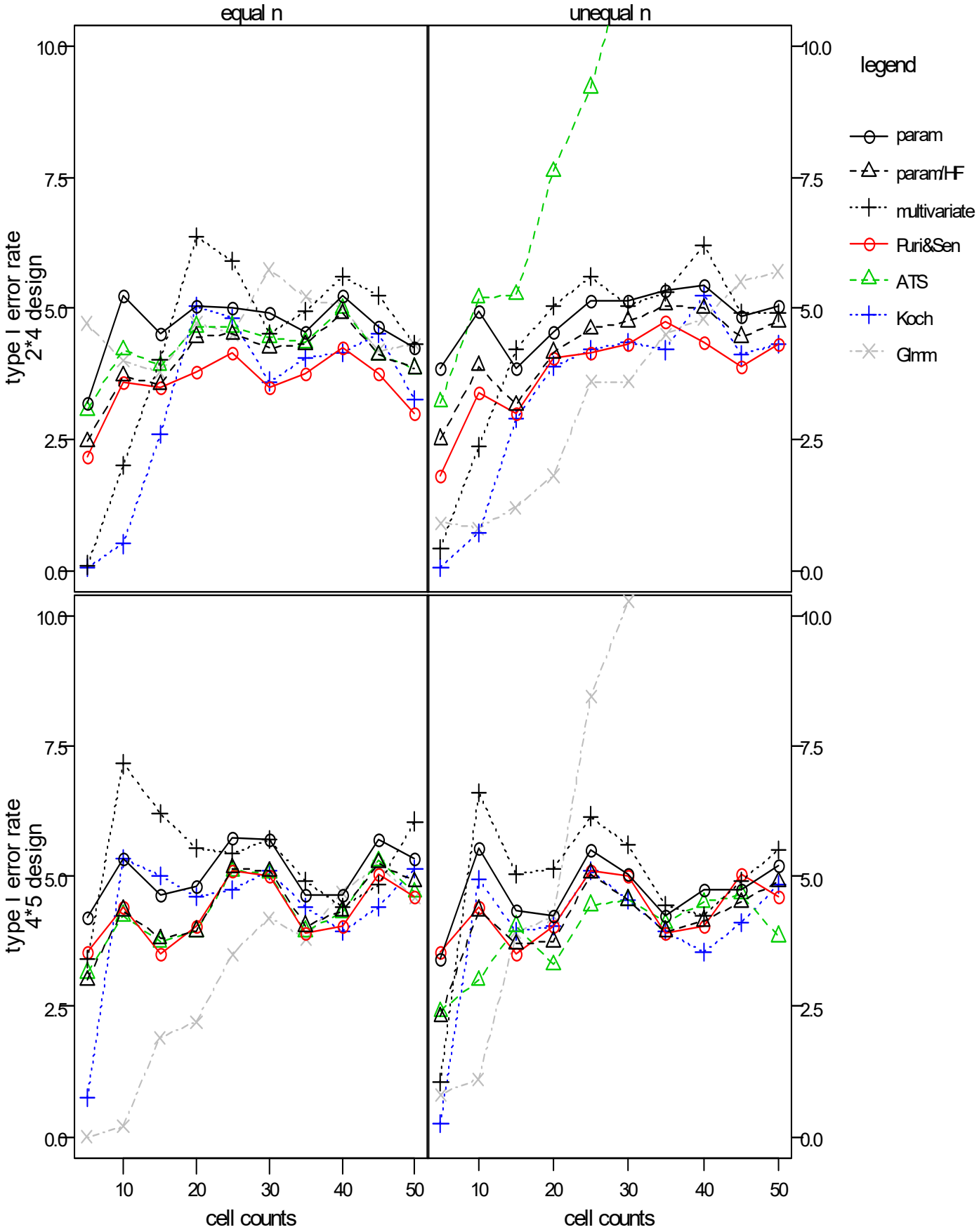
3. 7. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.80	4.55	4.70	5.25	5.45	4.55	4.45	4.60	5.70	5.00	5.55	4.95	5.00	5.35
	par./ HF-corr.	3.35	4.15	4.25	4.85	5.30	4.15	4.40	3.80	4.70	4.70	5.20	4.85	4.75	5.15
	multivariate	0.50	3.90	4.95	6.00	4.85	4.50	5.00	1.45	5.10	4.50	6.00	5.50	4.70	5.85
	Puri & Sen	1.85	3.30	3.10	3.20	4.05	3.05	3.55	2.40	3.90	4.15	4.35	4.10	3.80	4.40
	ATS	4.25	4.50	4.65	4.95	5.25	4.20	4.35	5.95	7.30	8.30	11.60	14.55	19.90	24.00
	ATS (uncorr.)								3.5	4.65	4.25	4.4	4.7	4.45	4.9
	Koch	0.05	2.35	3.00	4.20	3.65	3.60	3.85	0.05	2.45	3.40	3.90	4.25	3.75	4.85
	GLMM	1.01	2.82	1.81	2.82	1.71	1.41	1.01	0.20	1.90	3.50	4.50	6.00	4.40	4.70
4*5	parametric	5.40	4.40	5.15	5.25	4.75	4.55	5.50	5.10	4.70	5.50	4.85	5.20	4.85	5.20
	par./ HF-corr.	4.55	3.60	4.70	4.95	4.50	4.15	5.20	4.45	4.35	4.90	4.50	4.85	4.55	4.95
	multivariate	6.20	4.45	5.40	4.80	5.15	4.45	5.25	2.65	4.45	4.90	4.90	4.95	4.15	5.05
	Puri & Sen	4.10	3.05	4.25	4.50	3.90	3.60	4.80	4.10	3.05	4.25	4.50	3.90	3.60	4.80
	ATS	4.60	3.45	4.80	4.90	4.25	4.05	5.15	4.50	2.85	3.60	4.35	4.80	4.55	4.65
	ATS (uncorr.)								4.5	2.85	3.6	4.35	4.8	4.55	4.65
	Koch	2.95	3.55	4.30	3.85	4.00	3.70	4.75	0.80	3.05	3.75	3.80	4.00	3.60	4.60
	GLMM	0.00	1.60	2.90	3.30	3.10	2.90	5.70	0.40	2.10	5.60	4.20	3.50	1.70	2.60


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 7. 1. 3 p = 0.9

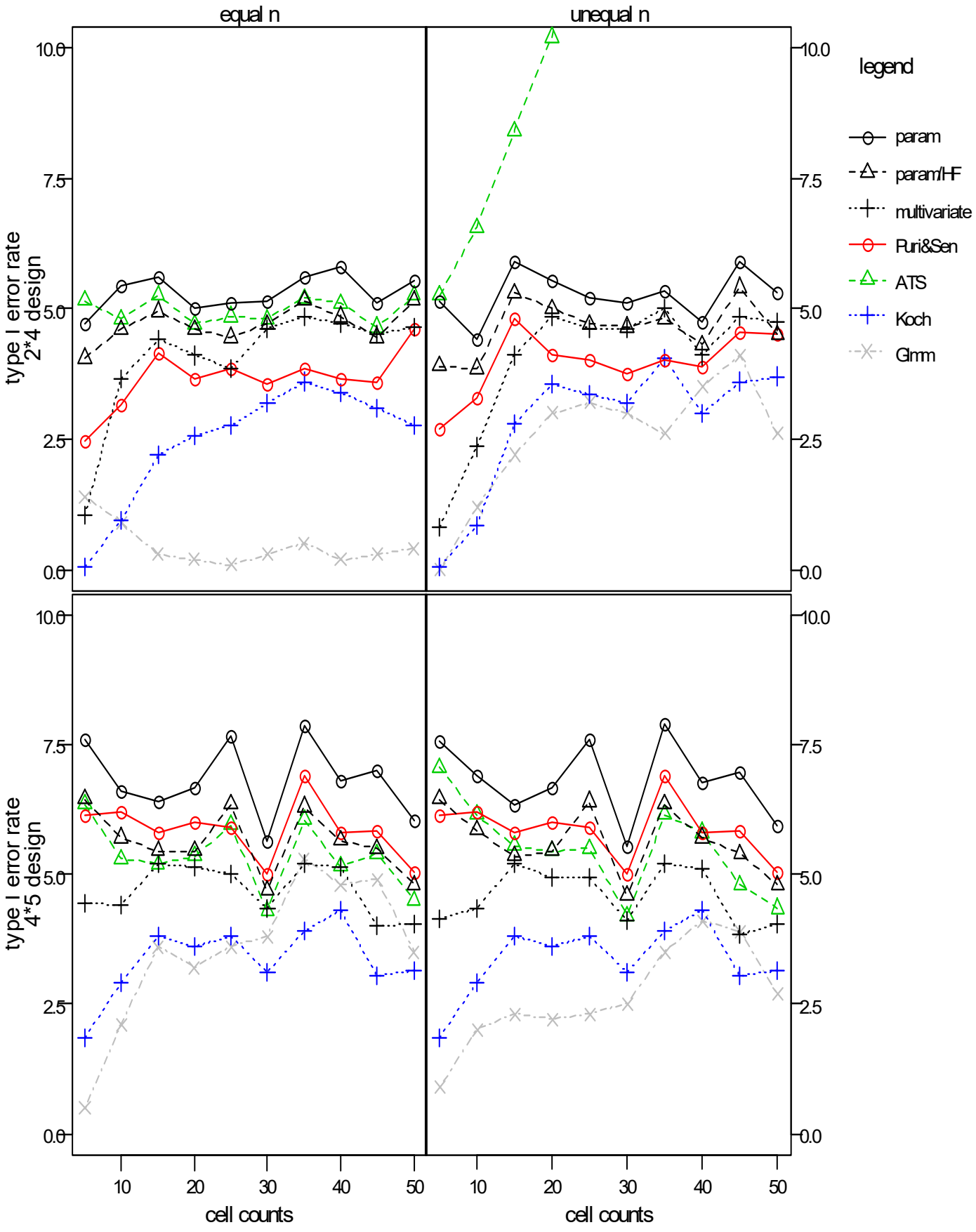
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.20	5.25	4.50	5.05	4.90	5.25	4.25	3.85	4.95	3.85	4.55	5.15	5.45	5.05
	par./ HF-corr.	2.45	3.70	3.55	4.45	4.25	4.90	3.85	2.50	3.90	3.15	4.15	4.75	5.00	4.75
	multivariate	0.10	2.00	4.00	6.35	4.50	5.60	4.30	0.40	2.35	4.20	5.05	5.05	6.20	4.90
	Puri & Sen	2.15	3.60	3.50	3.80	3.50	4.25	3.00	1.80	3.40	3.00	4.05	4.30	4.35	4.30
	ATS	3.05	4.20	3.90	4.65	4.45	5.00	3.85	3.20	5.20	5.25	7.60	11.70	14.20	18.85
	ATS (uncorr.)								3.1	4.7	3.3	4.7	4.95	4.45	4.45
	Koch	0.05	0.50	2.60	5.05	3.60	4.15	3.25	0.05	0.70	2.90	3.90	4.35	5.25	4.30
	GLMM	4.71	3.99	3.79	4.71	5.73	5.02	4.30	0.90	0.80	1.20	1.80	3.60	4.80	5.70
4*5	parametric	4.20	5.35	4.65	4.80	5.70	4.65	5.35	3.40	5.55	4.35	4.25	5.05	4.75	5.20
	par./ HF-corr.	3.00	4.35	3.80	3.95	5.10	4.35	4.90	2.30	4.35	3.70	3.75	4.55	4.15	4.90
	multivariate	3.40	7.15	6.20	5.55	5.70	4.40	6.05	1.05	6.60	5.05	5.15	5.60	4.25	5.50
	Puri & Sen	3.55	4.40	3.50	4.05	5.00	4.05	4.60	3.55	4.40	3.50	4.05	5.00	4.05	4.60
	ATS	3.15	4.25	3.75	3.95	5.05	4.30	4.70	2.40	3.00	4.05	3.30	4.55	4.50	3.85
	ATS (uncorr.)								2.4	3.00	4.05	3.3	4.55	4.5	3.85
	Koch	0.75	5.35	5.00	4.60	5.10	3.95	5.15	0.25	4.95	3.95	4.05	4.55	3.55	4.85
	GLMM	0.00	0.20	1.90	2.20	4.20	4.70	4.60	0.80	1.11	3.92	4.23	10.26	13.68	14.08


equal n
unequal n
type I error rate
2*4 design
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 7. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

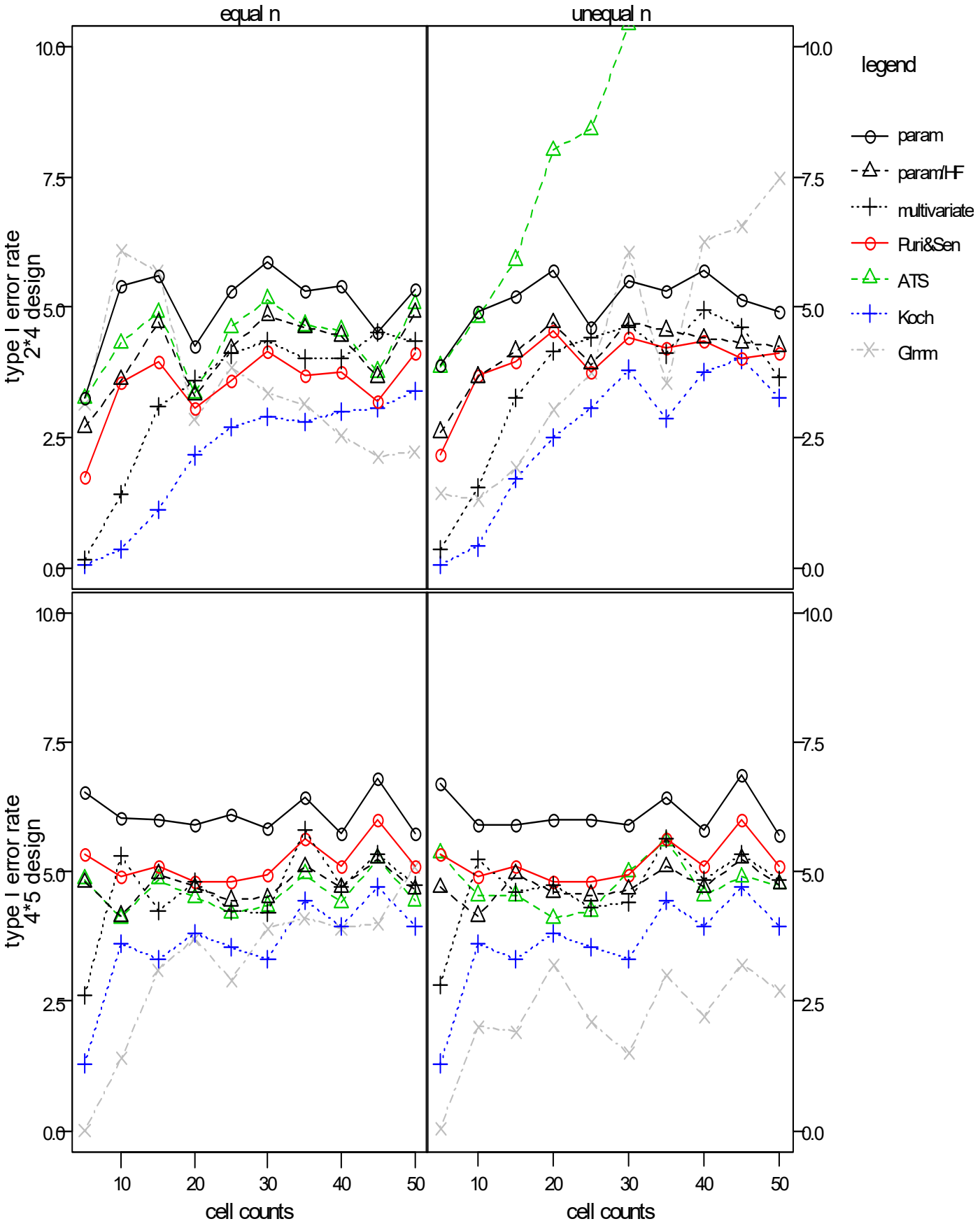
3. 7. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	4.70	5.45	5.60	5.00	5.15	5.80	5.55	5.15	4.40	5.90	5.55	5.10	4.75	5.30
	par./ HF-corr.	4.05	4.60	4.95	4.60	4.70	4.85	5.15	3.90	3.85	5.30	5.00	4.65	4.30	4.50
	multivariate	1.05	3.65	4.40	4.10	4.60	4.70	4.65	0.80	2.35	4.10	4.85	4.60	4.10	4.75
	Puri & Sen	2.45	3.15	4.15	3.65	3.55	3.65	4.60	2.70	3.30	4.80	4.10	3.75	3.90	4.50
	ATS	5.15	4.80	5.25	4.70	4.80	5.10	5.25	5.25	6.55	8.40	10.20	14.80	19.70	24.65
	ATS (uncorr.)								4.25	4.95	4.9	5.00	4.7	4.1	4.45
	Koch	0.05	0.95	2.20	2.55	3.20	3.40	2.75	0.05	0.85	2.80	3.55	3.20	3.00	3.70
	GLMM	1.40	0.90	0.30	0.20	0.30	0.20	0.40	0.00	1.20	2.20	3.00	3.00	3.50	2.60
4*5	parametric	7.60	6.60	6.40	6.65	5.65	6.80	6.05	7.55	6.90	6.35	6.65	5.55	6.75	5.95
	par./ HF-corr.	6.45	5.70	5.45	5.45	4.70	5.65	4.80	6.45	5.85	5.35	5.45	4.60	5.70	4.80
	multivariate	4.45	4.40	5.20	5.15	4.35	5.15	4.05	4.15	4.35	5.20	4.95	4.10	5.10	4.05
	Puri & Sen	6.15	6.20	5.80	6.00	5.00	5.80	5.05	6.15	6.20	5.80	6.00	5.00	5.80	5.05
	ATS	6.35	5.30	5.20	5.35	4.30	5.15	4.50	7.05	6.15	5.55	5.45	4.20	5.80	4.35
	ATS (uncorr.)								5.65	5.2	5.5	5.05	4.75	5.00	4.25
	Koch	1.85	2.90	3.80	3.60	3.10	4.30	3.15	1.85	2.90	3.80	3.60	3.10	4.30	3.15
	GLMM	0.50	2.10	3.60	3.20	3.80	4.80	3.50	0.90	2.00	2.30	2.20	2.50	4.10	2.70


equal n
unequal n
type I error rate
2*4 design
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm
0.0
2.5
5.0
7.5
10.0
10
20
30
40
50

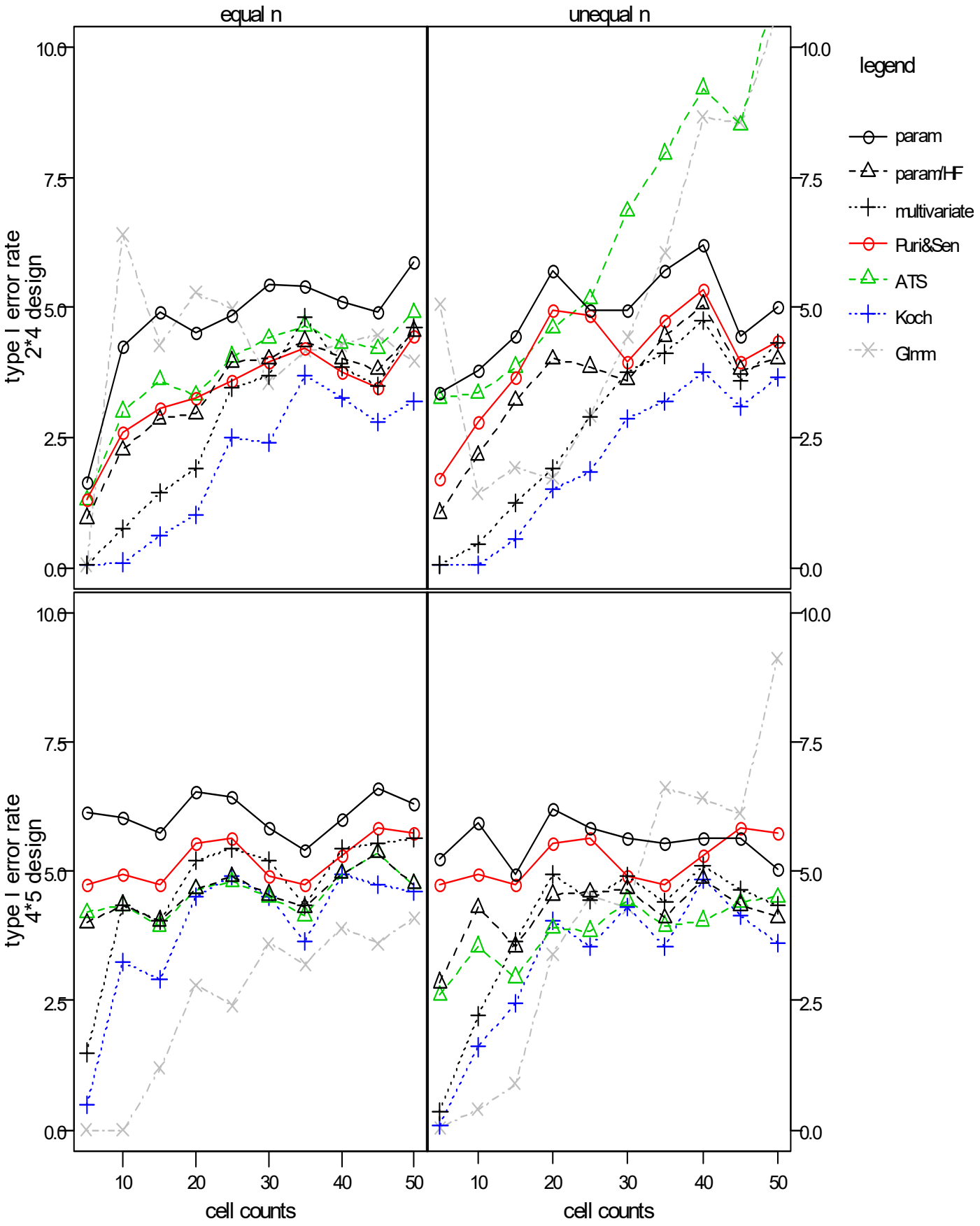
3. 7. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.25	5.40	5.60	4.25	5.85	5.40	5.35	3.90	4.90	5.20	5.70	5.50	5.70	4.90
	par./ HF-corr.	2.70	3.60	4.70	3.30	4.85	4.45	4.90	2.60	3.65	4.15	4.70	4.70	4.40	4.25
	multivariate	0.15	1.40	3.10	3.60	4.35	4.00	4.35	0.35	1.55	3.25	4.15	4.65	4.95	3.65
	Puri & Sen	1.75	3.55	3.95	3.05	4.15	3.75	4.10	2.15	3.70	3.95	4.55	4.40	4.35	4.10
	ATS	3.25	4.30	4.90	3.35	5.15	4.55	5.05	3.85	4.80	5.90	8.00	10.40	16.00	17.65
	ATS (uncorr.)								2.85	3.9	4.0	5.1	5.1	5.05	5.0
	Koch	0.05	0.35	1.10	2.15	2.90	3.00	3.40	0.05	0.40	1.70	2.50	3.80	3.75	3.25
	GLMM	3.14	6.07	5.67	2.83	3.34	2.53	2.23	1.41	1.31	1.92	3.02	6.05	6.25	7.46
4*5	parametric	6.55	6.05	6.00	5.90	5.85	5.75	5.75	6.70	5.90	5.90	6.00	5.90	5.80	5.70
	par./ HF-corr.	4.80	4.15	4.95	4.70	4.50	4.70	4.65	4.70	4.15	4.95	4.60	4.65	4.70	4.75
	multivariate	2.60	5.30	4.25	4.80	4.20	4.70	4.75	2.80	5.25	4.60	4.75	4.40	4.85	4.85
	Puri & Sen	5.35	4.90	5.10	4.80	4.95	5.10	5.10	5.35	4.90	5.10	4.80	4.95	5.10	5.10
	ATS	4.85	4.10	4.85	4.50	4.35	4.40	4.45	5.35	4.55	4.55	4.10	5.00	4.55	4.75
	ATS (uncorr.)								3.15	3.35	4.7	4.05	4.05	4.05	4.0
	Koch	1.30	3.60	3.30	3.80	3.30	3.95	3.95	1.30	3.60	3.30	3.80	3.30	3.95	3.95
	GLMM	0.00	1.40	3.10	3.70	3.90	3.90	5.10	0.05	2.00	1.90	3.20	1.50	2.20	2.70


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 7. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	1.65	4.25	4.90	4.50	5.45	5.10	5.85	3.35	3.80	4.45	5.70	4.95	6.20	5.00
	par./ HF-corr.	0.95	2.25	2.85	2.95	4.00	4.00	4.55	1.05	2.15	3.20	4.00	3.60	5.05	4.00
	multivariate	0.05	0.75	1.45	1.90	3.70	3.85	4.60	0.05	0.45	1.25	1.90	3.75	4.75	4.30
	Puri & Sen	1.30	2.60	3.05	3.25	3.95	3.75	4.45	1.70	2.80	3.65	4.95	3.95	5.35	4.35
	ATS	1.30	3.00	3.60	3.30	4.40	4.30	4.90	3.25	3.35	3.85	4.60	6.85	9.20	11.40
	ATS (uncorr.)								2.1	3.85	4.4	3.8	4.4	4.8	4.45
	Koch	0.05	0.10	0.60	1.00	2.40	3.25	3.20	0.05	0.05	0.55	1.50	2.85	3.75	3.65
	GLMM	0.05	6.40	4.26	5.28	3.55	4.26	3.96	5.07	1.42	1.93	1.71	4.43	8.65	10.66
4*5	parametric	6.15	6.05	5.75	6.55	5.85	6.00	6.30	5.25	5.95	4.95	6.20	5.65	5.65	5.05
	par./ HF-corr.	4.00	4.35	4.05	4.65	4.55	4.95	4.75	2.85	4.30	3.55	4.55	4.65	4.85	4.10
	multivariate	1.50	4.35	4.05	5.20	5.20	5.45	5.65	0.35	2.20	3.65	4.95	4.90	5.10	4.35
	Puri & Sen	4.75	4.95	4.75	5.55	4.90	5.30	5.75	4.75	4.95	4.75	5.55	4.90	5.30	5.75
	ATS	4.20	4.35	3.95	4.65	4.50	4.95	4.75	2.60	3.55	2.95	3.90	4.45	4.05	4.50
	ATS (uncorr.)								2.6	3.55	2.95	3.9	4.45	4.05	4.5
	Koch	0.50	3.25	2.90	4.50	4.50	4.95	4.60	0.10	1.60	2.45	4.05	4.30	4.85	3.60
	GLMM	0.00	0.00	1.20	2.80	3.60	3.90	4.10	0.05	0.40	0.90	3.40	4.30	6.41	9.11

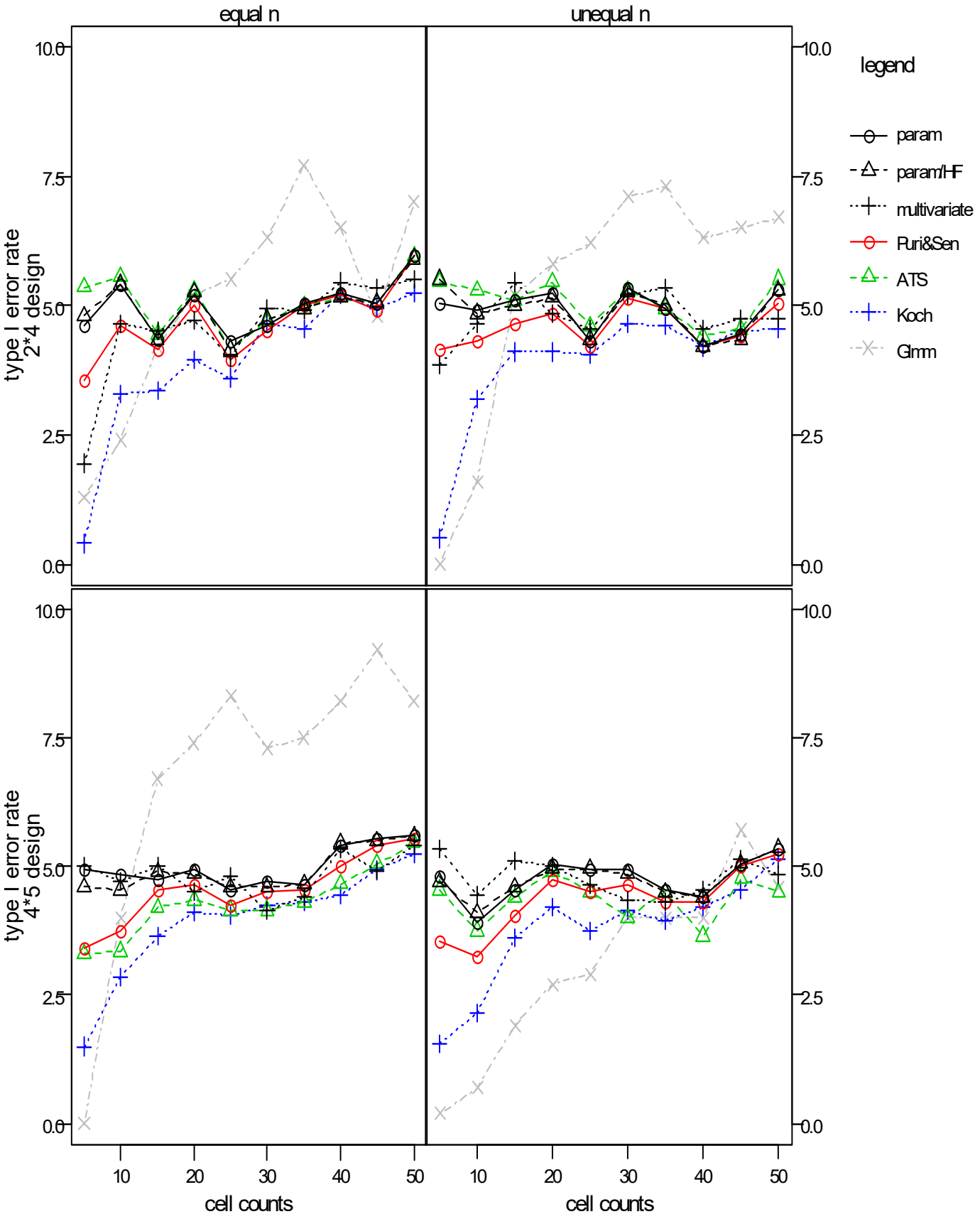

equal n
unequal n
type I error rate
2*4 design
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 8. Interaction AB - null model

3. 8. 1. equal correlations on B (r=0.3)

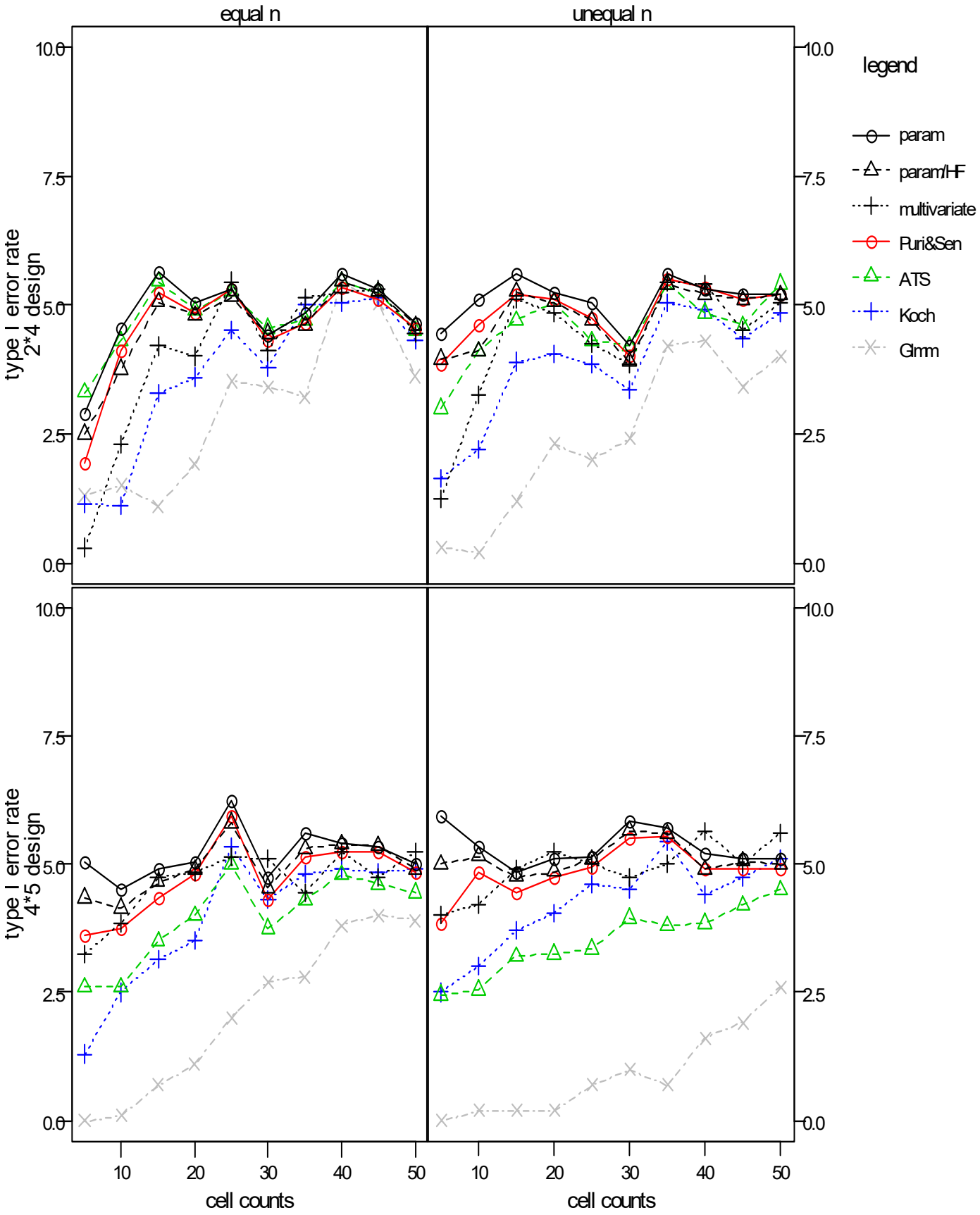
3. 8. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	4.60	5.40	4.35	5.20	4.60	5.25	5.95	5.05	4.90	5.10	5.25	5.35	4.20	5.30
	par./ HF-corr.	4.80	5.40	4.35	5.25	4.75	5.15	5.90	5.50	4.85	5.00	5.15	5.25	4.20	5.30
	multivariate	1.95	4.65	4.50	4.70	4.95	5.45	5.50	3.85	4.65	5.45	4.85	5.20	4.55	4.75
	Puri & Sen	3.55	4.60	4.15	5.00	4.50	5.20	5.95	4.15	4.30	4.65	4.85	5.15	4.20	5.05
	ATS	5.35	5.55	4.45	5.30	4.70	5.15	5.95	5.45	5.30	5.10	5.45	5.30	4.40	5.50
	Koch	0.40	3.30	3.35	3.95	4.65	5.20	5.25	0.50	3.20	4.10	4.10	4.65	4.20	4.55
	GLMM	1.30	2.40	4.20	5.20	6.30	6.50	7.00	0.00	1.60	5.20	5.80	7.10	6.30	6.70
4*5	parametric	4.95	4.85	4.75	4.95	4.70	5.40	5.60	4.80	3.90	4.55	5.05	4.95	4.40	5.35
	par./ HF-corr.	4.60	4.55	4.90	4.85	4.60	5.45	5.60	4.70	4.10	4.60	4.95	4.85	4.40	5.35
	multivariate	5.00	4.70	5.00	4.50	4.15	5.35	5.40	5.35	4.45	5.10	5.00	4.35	4.55	4.85
	Puri & Sen	3.40	3.75	4.55	4.65	4.50	5.00	5.55	3.55	3.25	4.05	4.75	4.65	4.30	5.25
	ATS	3.30	3.35	4.20	4.35	4.15	4.65	5.45	4.55	3.75	4.40	4.90	4.00	3.65	4.50
	Koch	1.50	2.85	3.65	4.10	4.25	4.45	5.25	1.55	2.15	3.60	4.20	4.15	4.20	5.15
	GLMM	0.00	4.00	6.70	7.40	7.30	8.20	8.20	0.20	0.70	1.90	2.70	4.00	4.00	4.60


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

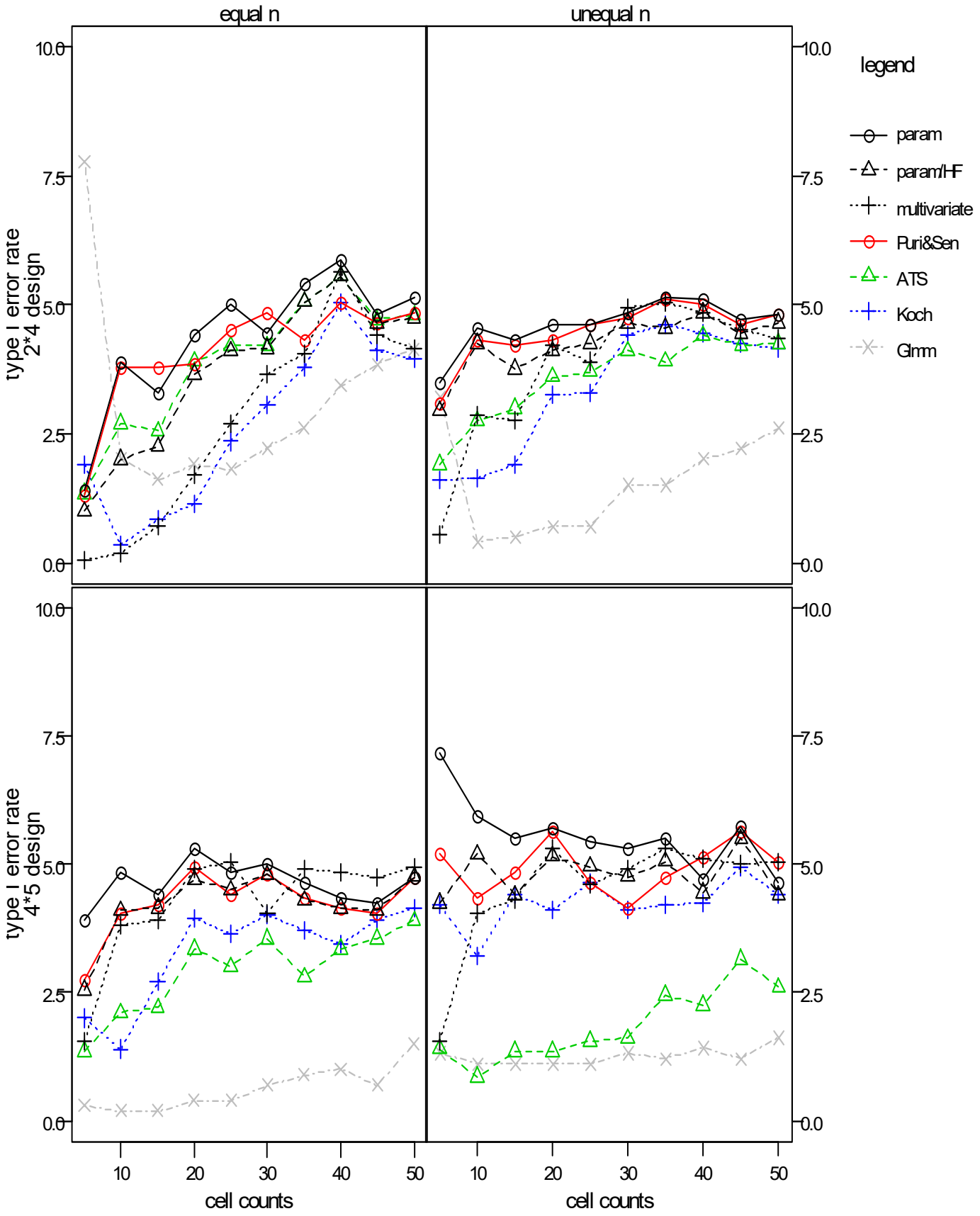
3. 8. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	2.90	4.55	5.65	5.05	4.40	5.60	4.65	4.45	5.10	5.60	5.25	4.20	5.30	5.20
	par./ HF-corr.	2.50	3.75	5.05	4.80	4.45	5.45	4.60	3.95	4.10	5.25	5.05	3.90	5.20	5.20
	multivariate	0.30	2.30	4.20	4.00	4.10	5.25	4.45	1.25	3.25	5.10	4.85	3.85	5.40	5.05
	Puri & Sen	1.95	4.10	5.25	4.85	4.30	5.35	4.55	3.85	4.60	5.20	5.10	4.00	5.35	5.20
	ATS	3.30	4.30	5.45	4.90	4.55	5.45	4.50	3.00	4.10	4.70	5.05	4.20	4.85	5.40
	Koch	1.15	1.10	3.30	3.60	3.80	5.05	4.30	1.65	2.20	3.90	4.05	3.35	4.90	4.85
	GLMM	1.31	1.51	1.11	1.91	3.42	5.43	3.62	0.30	0.20	1.20	2.30	2.40	4.31	4.01
4*5	parametric	5.05	4.50	4.90	5.05	4.75	5.40	5.00	5.95	5.35	4.85	5.10	5.85	5.20	5.10
	par./ HF-corr.	4.35	4.15	4.65	4.90	4.55	5.40	4.90	5.00	5.15	4.75	4.85	5.65	4.90	5.00
	multivariate	3.25	3.85	4.75	4.85	5.10	5.25	5.25	4.00	4.20	4.90	5.25	4.75	5.65	5.60
	Puri & Sen	3.60	3.75	4.35	4.80	4.30	5.25	4.85	3.85	4.85	4.45	4.75	5.50	4.90	4.90
	ATS	2.60	2.60	3.50	4.00	3.75	4.80	4.45	2.45	2.55	3.20	3.25	3.95	3.85	4.50
	Koch	1.30	2.50	3.15	3.50	4.30	4.90	4.90	2.50	3.00	3.70	4.05	4.50	4.40	5.10
	GLMM	0.00	0.10	0.70	1.10	2.70	3.80	3.90	0.00	0.20	0.20	0.20	1.00	1.60	2.60


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 8. 1. 3 p = 0.9

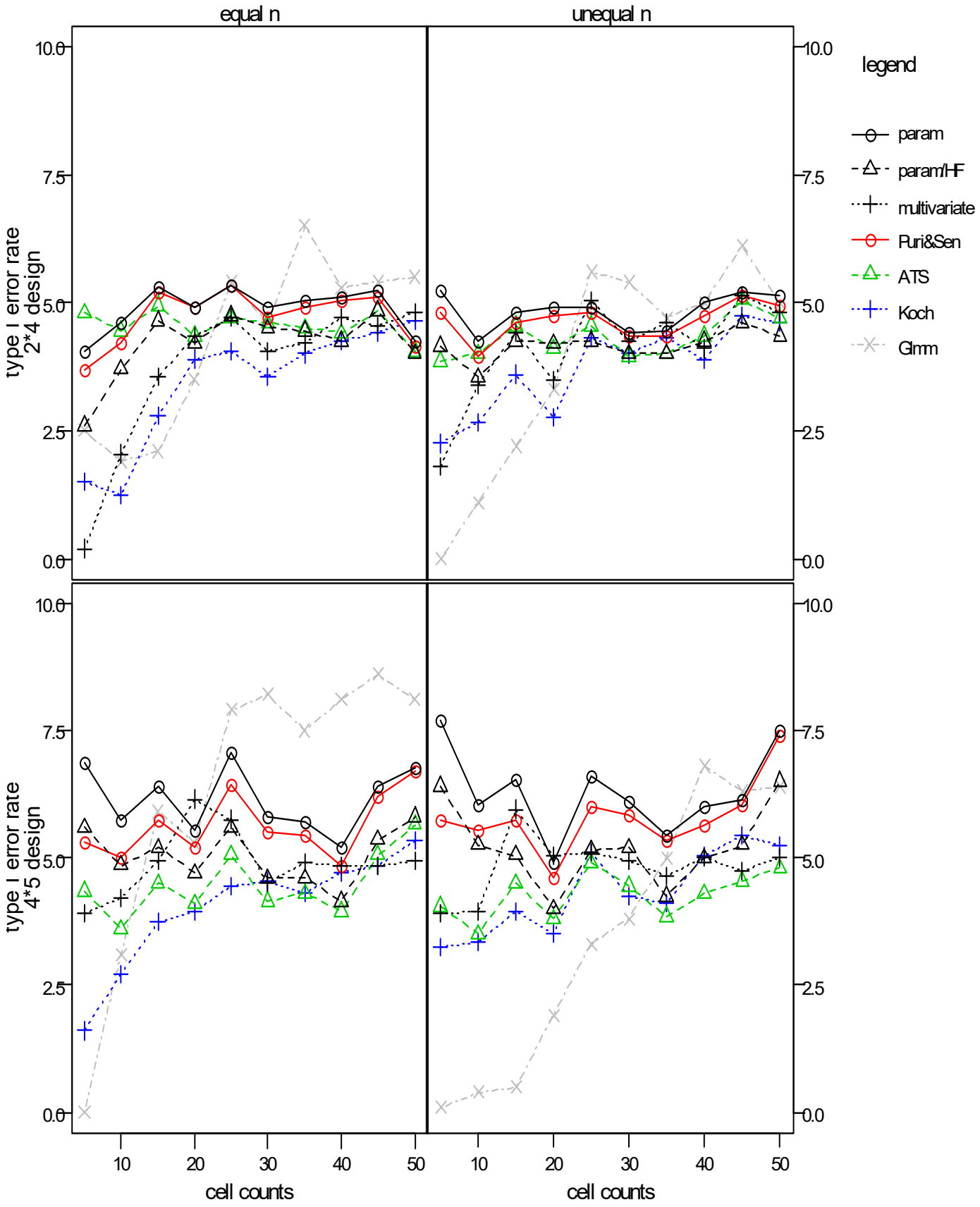
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	1.40	3.90	3.30	4.40	4.45	5.85	5.15	3.50	4.55	4.30	4.60	4.85	5.10	4.80
	par./ HF-corr.	1.00	2.00	2.25	3.65	4.15	5.55	4.75	2.95	4.25	3.75	4.10	4.65	4.85	4.65
	multivariate	0.05	0.20	0.70	1.70	3.65	5.65	4.15	0.55	2.85	2.75	4.20	4.95	4.85	4.35
	Puri & Sen	1.30	3.80	3.80	3.85	4.85	5.05	4.85	3.10	4.30	4.20	4.30	4.75	5.00	4.80
	ATS	1.35	2.70	2.55	3.90	4.20	5.55	4.80	1.90	2.75	3.00	3.60	4.10	4.40	4.25
	Koch	1.90	0.35	0.85	1.15	3.05	5.05	3.95	1.60	1.65	1.90	3.25	4.40	4.45	4.15
	GLMM	7.77	2.02	1.61	1.92	2.22	3.43	4.14	3.21	0.40	0.50	0.70	1.51	2.01	2.61
4*5	parametric	3.90	4.85	4.40	5.30	5.00	4.35	4.75	7.15	5.95	5.50	5.70	5.30	4.70	4.65
	par./ HF-corr.	2.55	4.10	4.15	4.70	4.80	4.15	4.75	4.25	5.20	4.40	5.15	4.75	4.45	4.40
	multivariate	1.55	3.80	3.90	4.90	4.05	4.85	4.95	1.55	4.05	4.30	5.30	4.90	5.10	5.05
	Puri & Sen	2.75	4.05	4.20	4.95	4.80	4.15	4.75	5.20	4.35	4.85	5.65	4.15	5.15	5.05
	ATS	1.35	2.10	2.20	3.35	3.55	3.35	3.90	1.40	0.85	1.35	1.35	1.60	2.25	2.60
	Koch	2.00	1.40	2.70	3.95	4.00	3.45	4.15	4.20	3.20	4.40	4.10	4.10	4.25	4.40
	GLMM	0.30	0.20	0.20	0.40	0.70	1.00	1.50	1.31	1.11	1.11	1.11	1.31	1.42	1.62


equal n
unequal n
type I error rate
2*4 design
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 8. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

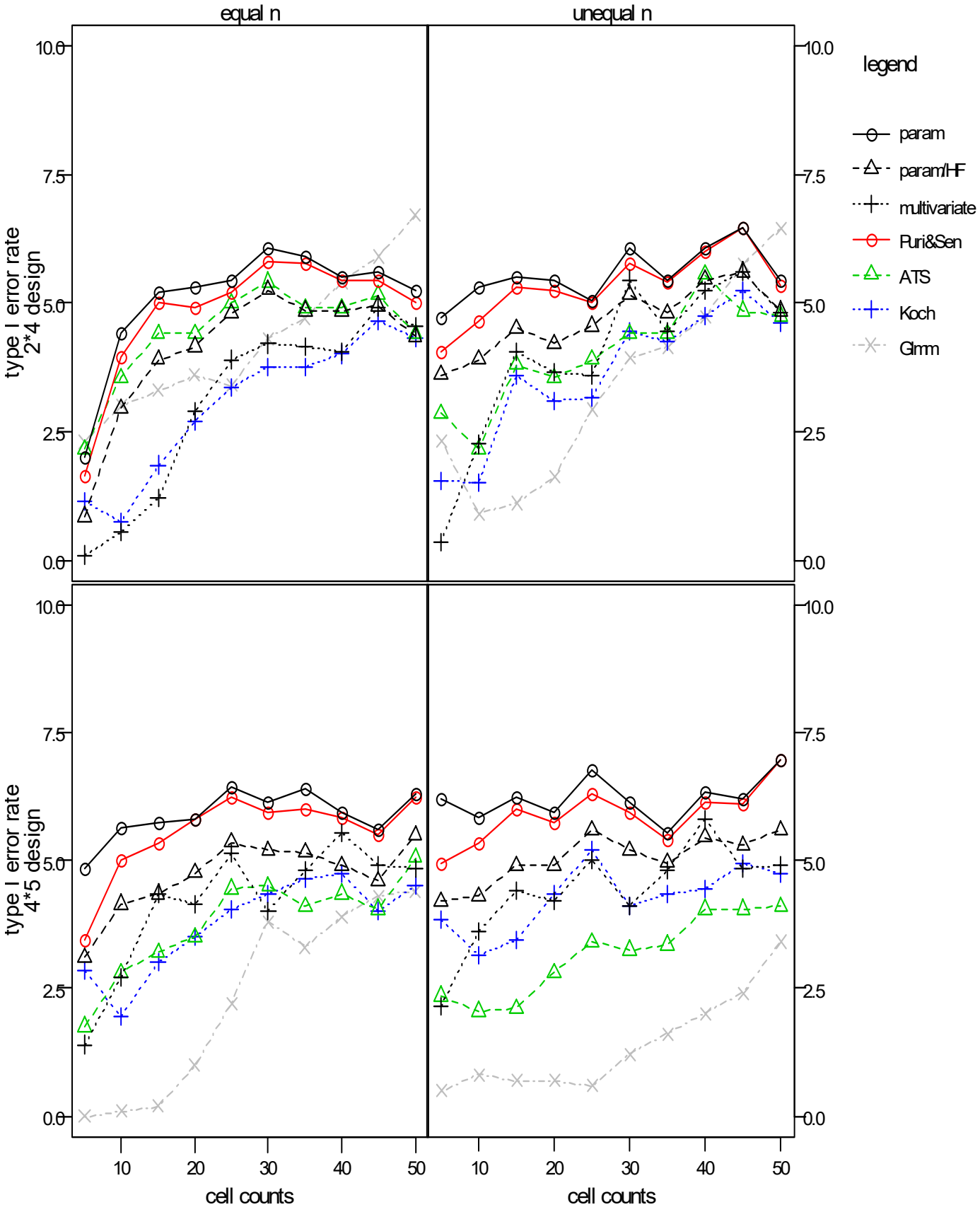
3. 8. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	4.05	4.60	5.30	4.90	4.90	5.10	4.25	5.25	4.25	4.80	4.90	4.40	5.00	5.15
	par./ HF-corr.	2.60	3.70	4.65	4.20	4.50	4.25	4.00	4.15	3.55	4.25	4.20	4.00	4.25	4.35
	multivariate	0.20	2.05	3.55	4.35	4.05	4.70	4.80	1.80	3.40	4.40	3.50	4.25	4.10	4.80
	Puri & Sen	3.70	4.20	5.20	4.90	4.70	5.05	4.15	4.80	3.95	4.60	4.75	4.35	4.75	4.95
	ATS	4.80	4.45	4.95	4.35	4.60	4.40	4.05	3.85	4.00	4.55	4.10	3.95	4.35	4.70
	Koch	1.50	1.25	2.80	3.90	3.55	4.25	4.65	2.25	2.65	3.60	2.75	4.00	3.90	4.60
	GLMM	2.50	1.90	2.10	3.50	4.60	5.30	5.50	0.00	1.10	2.20	3.30	5.40	5.00	5.00
4*5	parametric	6.85	5.75	6.40	5.55	5.80	5.20	6.75	7.70	6.05	6.55	4.90	6.10	6.00	7.50
	par./ HF-corr.	5.60	4.85	5.20	4.70	4.60	4.15	5.80	6.40	5.25	5.05	4.00	5.20	5.00	6.50
	multivariate	3.90	4.20	4.95	6.15	4.50	4.85	4.95	3.90	3.95	5.95	5.05	4.95	5.00	5.00
	Puri & Sen	5.30	5.00	5.75	5.20	5.50	4.85	6.70	5.75	5.55	5.75	4.60	5.85	5.65	7.40
	ATS	4.35	3.60	4.50	4.10	4.15	3.95	5.65	4.05	3.50	4.50	3.80	4.45	4.30	4.80
	Koch	1.60	2.70	3.75	3.95	4.55	4.70	5.35	3.25	3.35	3.95	3.50	4.25	5.05	5.25
	GLMM	0.00	3.10	5.90	5.30	8.20	8.10	8.10	0.10	0.40	0.50	1.90	3.80	6.80	6.40


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

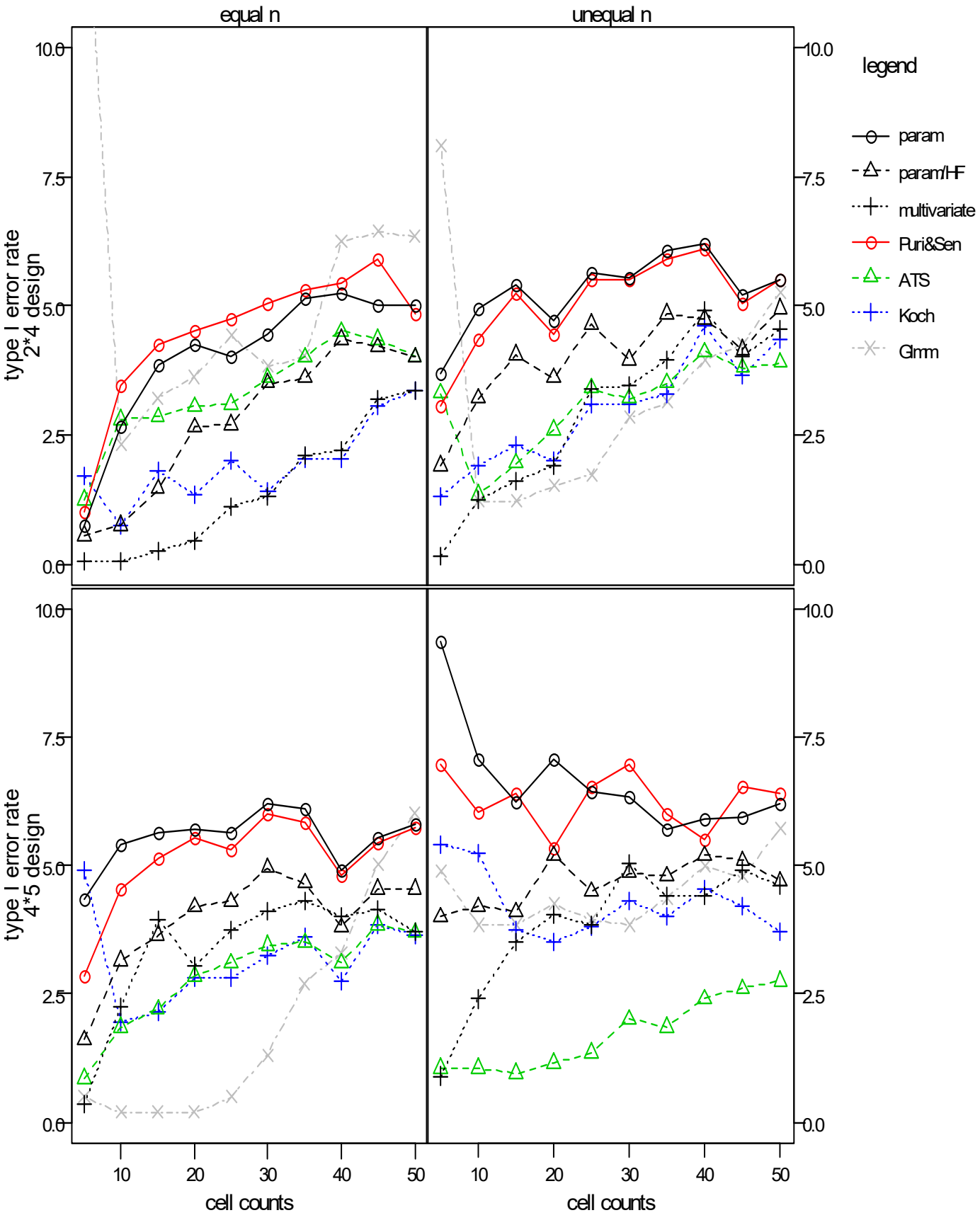
3. 8. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	2.00	4.40	5.20	5.30	6.05	5.50	5.25	4.70	5.30	5.50	5.45	6.05	6.05	5.45
	par./ HF-corr.	0.85	2.95	3.90	4.15	5.25	4.85	4.35	3.60	3.90	4.50	4.20	5.15	5.45	4.85
	multivariate	0.10	0.55	1.20	2.90	4.20	4.05	4.55	0.35	2.25	4.05	3.65	5.45	5.25	4.80
	Puri & Sen	1.65	3.95	5.00	4.90	5.80	5.45	5.00	4.05	4.65	5.30	5.25	5.75	6.00	5.35
	ATS	2.15	3.55	4.40	4.40	5.40	4.90	4.40	2.85	2.15	3.80	3.55	4.40	5.55	4.75
	Koch	1.15	0.75	1.85	2.70	3.75	4.00	4.30	1.55	1.50	3.60	3.10	4.45	4.75	4.60
	GLMM	2.30	3.00	3.30	3.60	4.30	5.40	6.70	2.32	0.91	1.11	1.61	3.93	4.74	6.45
4*5	parametric	4.85	5.65	5.75	5.80	6.15	5.95	6.30	6.20	5.85	6.25	5.95	6.15	6.35	6.95
	par./ HF-corr.	3.10	4.15	4.35	4.75	5.20	4.90	5.50	4.20	4.30	4.90	4.90	5.20	5.45	5.60
	multivariate	1.40	2.70	4.35	4.15	4.00	5.55	4.85	2.15	3.60	4.40	4.20	4.10	5.80	4.90
	Puri & Sen	3.45	5.00	5.35	5.80	5.95	5.85	6.25	4.95	5.35	6.00	5.75	5.95	6.15	6.95
	ATS	1.75	2.80	3.20	3.50	4.50	4.35	5.05	2.35	2.05	2.10	2.80	3.25	4.05	4.10
	Koch	2.85	1.95	3.00	3.50	4.35	4.75	4.50	3.85	3.15	3.45	4.35	4.10	4.45	4.75
	GLMM	0.00	0.10	0.20	1.00	3.80	3.90	4.40	0.50	0.80	0.70	0.70	1.20	2.01	3.41


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 8. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	0.75	2.65	3.85	4.25	4.45	5.25	5.00	3.70	4.95	5.40	4.70	5.55	6.20	5.50
	par./ HF-corr.	0.55	0.75	1.45	2.65	3.50	4.35	4.00	1.90	3.20	4.05	3.60	3.95	4.75	4.95
	multivariate	0.05	0.05	0.25	0.45	1.30	2.20	3.35	0.15	1.25	1.60	1.90	3.45	4.90	4.55
	Puri & Sen	1.00	3.45	4.25	4.50	5.05	5.45	4.85	3.05	4.35	5.25	4.45	5.50	6.10	5.50
	ATS	1.25	2.80	2.85	3.05	3.60	4.50	4.00	3.30	1.35	1.95	2.60	3.20	4.10	3.90
	Koch	1.70	0.75	1.80	1.35	1.40	2.05	3.35	1.30	1.90	2.30	2.00	3.10	4.60	4.35
	GLMM	13.38	2.31	3.22	3.62	3.82	6.24	6.34	8.10	1.21	1.21	1.52	2.83	3.95	5.26
4*5	parametric	4.35	5.40	5.65	5.70	6.20	4.90	5.80	9.35	7.05	6.25	7.05	6.35	5.90	6.20
	par./ HF-corr.	1.60	3.15	3.65	4.20	4.95	3.80	4.55	4.00	4.20	4.10	5.20	4.85	5.20	4.70
	multivariate	0.35	2.25	3.95	3.05	4.10	4.00	3.70	0.90	2.40	3.50	4.05	5.05	4.40	4.60
	Puri & Sen	2.85	4.55	5.15	5.55	6.00	4.80	5.75	6.95	6.05	6.40	5.35	6.95	5.50	6.40
	ATS	0.85	1.85	2.20	2.85	3.45	3.10	3.70	1.05	1.05	0.95	1.15	2.00	2.40	2.75
	Koch	4.90	1.95	2.15	2.80	3.25	2.75	3.65	5.40	5.25	3.75	3.50	4.30	4.55	3.70
	GLMM	0.50	0.20	0.20	0.20	1.30	3.31	6.01	4.88	3.84	3.84	4.26	3.84	4.98	5.71

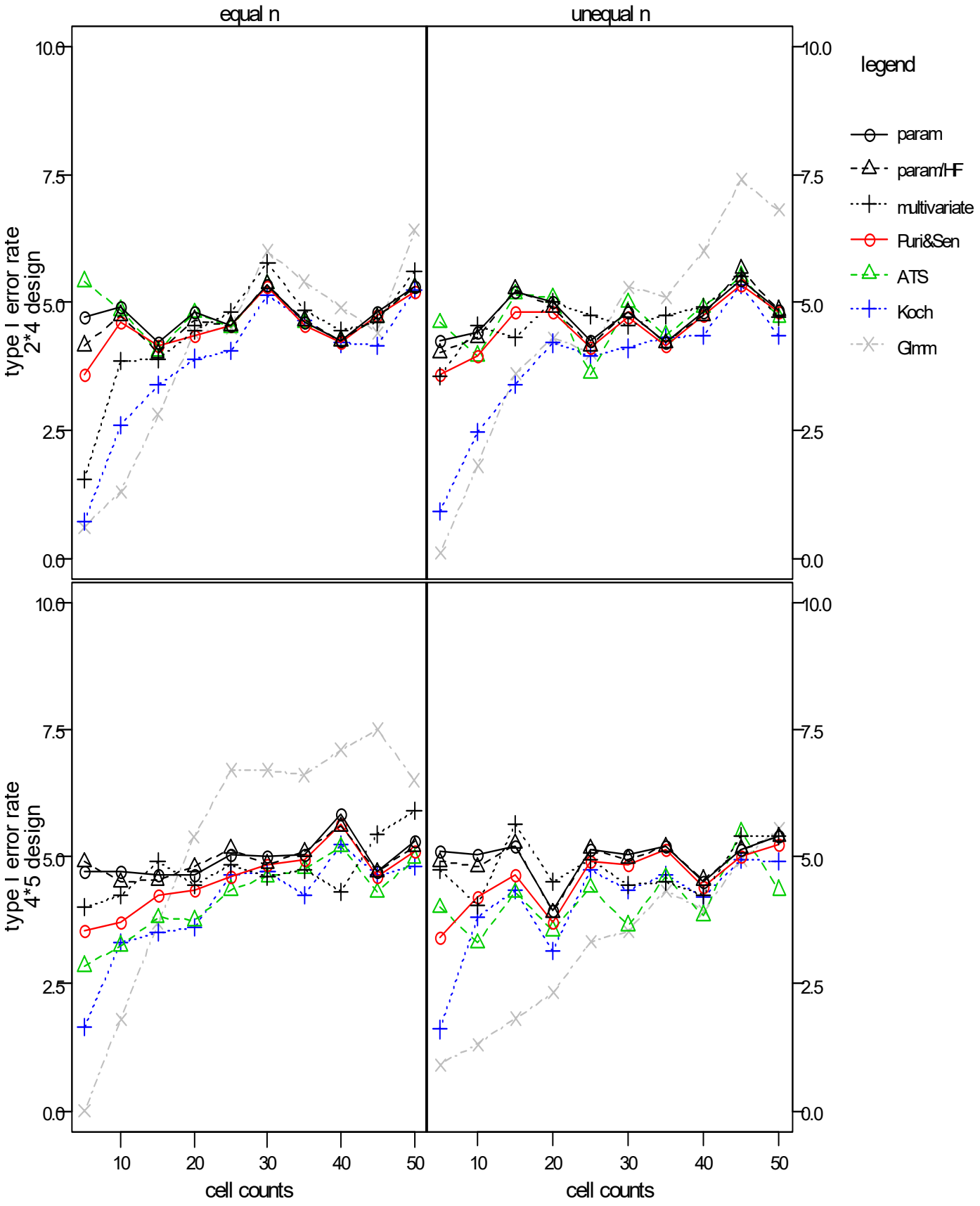

equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 9. Interaction AB - A significant (effects a_i = 0.6*s) n_i and p_i independent

3. 9. 1. equal correlations on B (r=0.3)

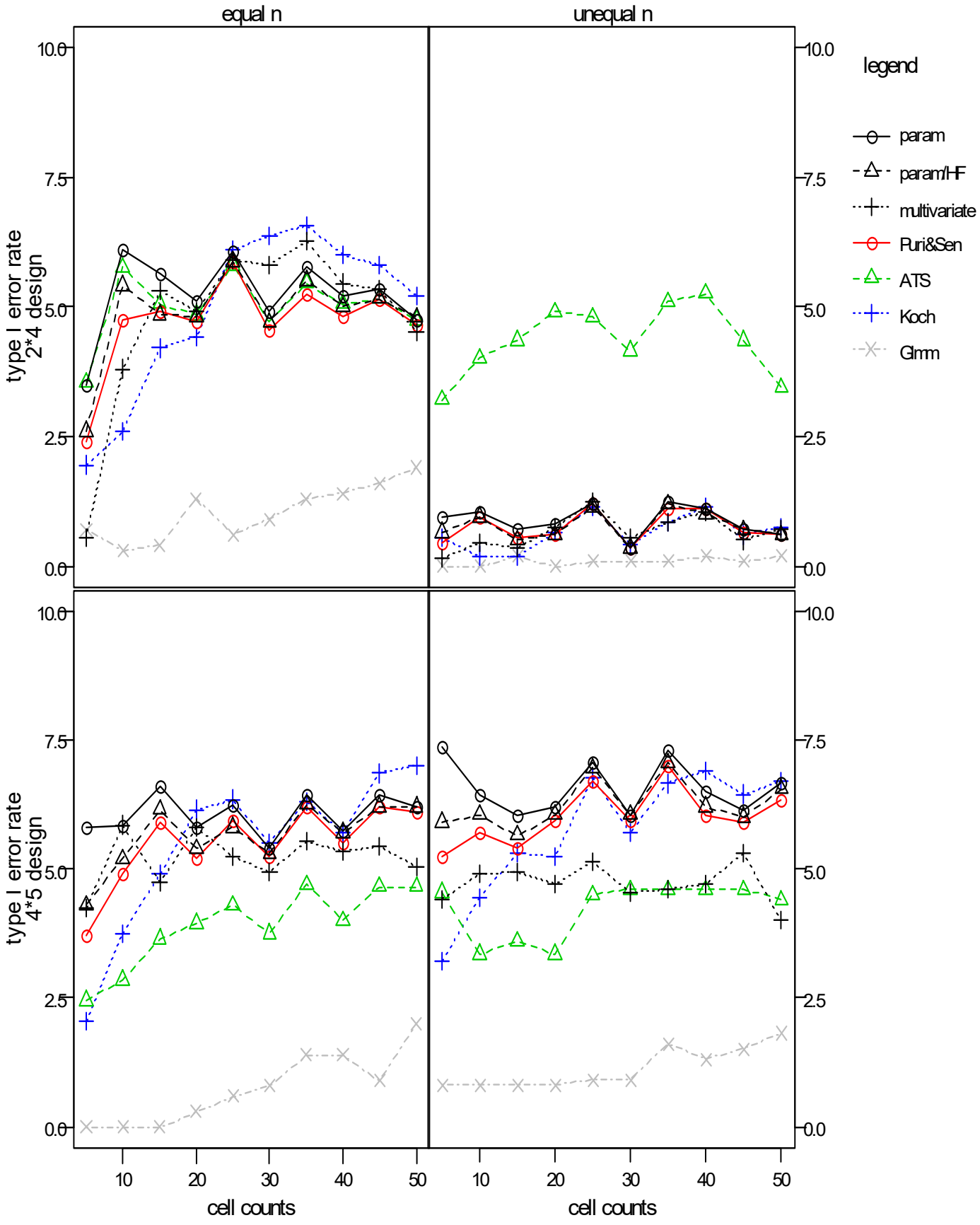
3. 9. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	4.70	4.90	4.20	4.80	5.35	4.25	5.30	4.25	4.40	5.20	5.00	4.80	4.80	4.85
	par./ HF-corr.	4.15	4.75	4.00	4.65	5.35	4.25	5.30	4.00	4.30	5.25	4.90	4.80	4.75	4.85
	multivariate	1.55	3.85	3.90	4.45	5.75	4.45	5.60	3.55	4.55	4.30	5.00	4.55	4.90	4.70
	Puri & Sen	3.60	4.60	4.15	4.35	5.30	4.20	5.20	3.60	3.95	4.80	4.80	4.70	4.75	4.80
	ATS	5.40	4.85	4.05	4.80	5.35	4.25	5.30	4.60	3.95	5.15	5.10	5.00	4.90	4.70
	Koch	0.70	2.60	3.40	3.90	5.15	4.20	5.25	0.90	2.45	3.40	4.20	4.10	4.35	4.35
	GLMM	0.60	1.30	2.80	4.40	6.00	4.90	6.40	0.10	1.80	3.60	4.30	5.30	6.00	6.80
4*5	parametric	4.70	4.70	4.65	4.65	5.00	5.85	5.30	5.10	5.05	5.20	3.95	5.05	4.50	5.40
	par./ HF-corr.	4.90	4.50	4.55	4.80	4.85	5.60	5.20	4.90	4.80	5.25	3.90	4.95	4.55	5.40
	multivariate	4.00	4.25	4.90	4.45	4.60	4.30	5.90	4.75	4.05	5.65	4.50	4.45	4.25	5.40
	Puri & Sen	3.55	3.70	4.25	4.35	4.85	5.65	5.10	3.40	4.20	4.65	3.70	4.85	4.40	5.25
	ATS	2.85	3.25	3.80	3.75	4.60	5.20	4.95	4.00	3.30	4.30	3.55	3.65	3.85	4.35
	Koch	1.65	3.30	3.50	3.60	4.70	5.25	4.80	1.60	3.80	4.35	3.15	4.35	4.20	4.90
	GLMM	0.00	1.80	3.70	5.40	6.70	7.10	6.50	0.91	1.31	1.81	2.32	3.53	3.93	5.54


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm
0.0
2.5
5.0
7.5
10.0
10
20
30
40
50

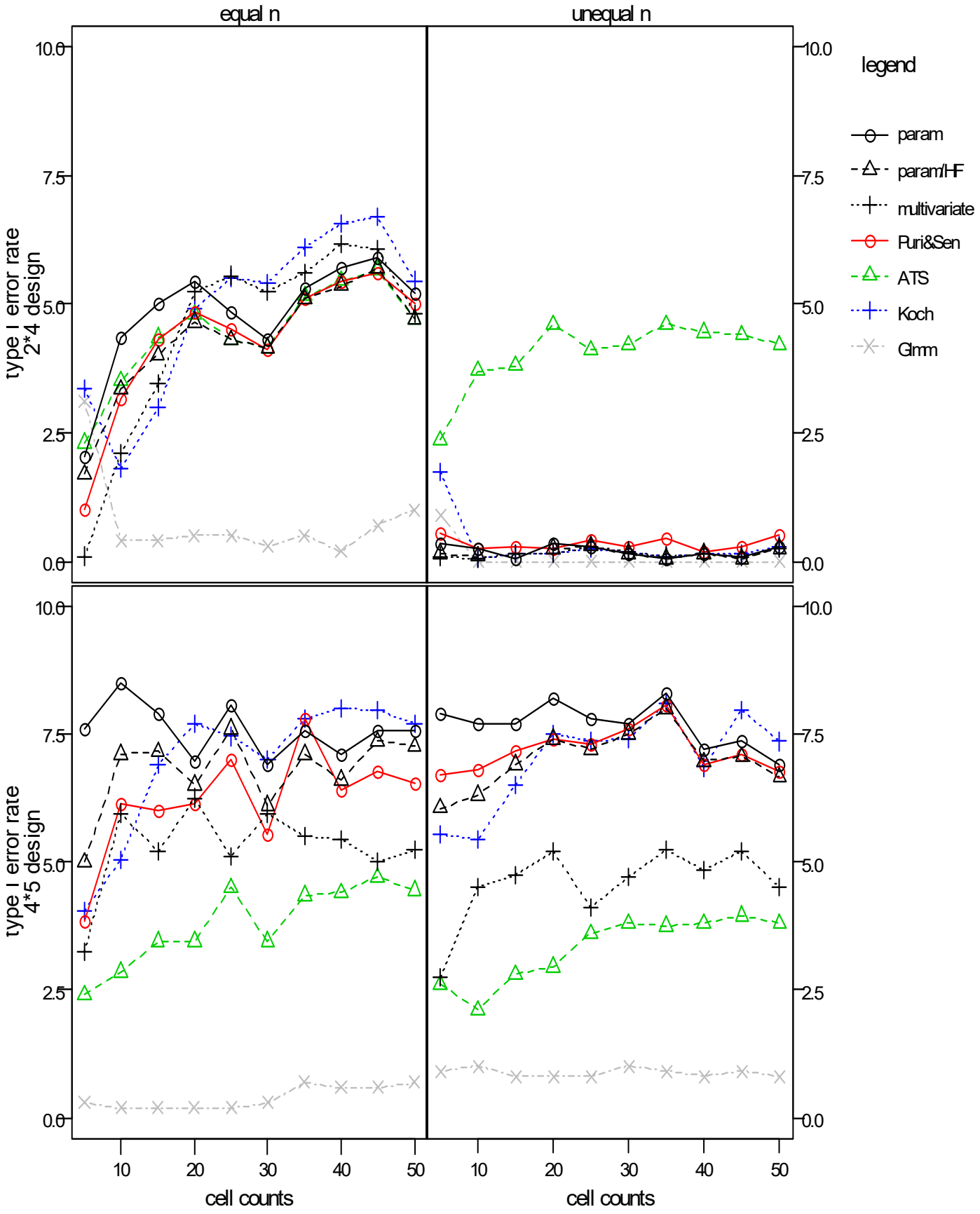
3. 9. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.50	6.10	5.65	5.10	4.90	5.20	4.75	0.95	1.05	0.70	0.80	0.35	1.10	0.60
	par./ HF-corr.	2.60	5.40	4.85	4.80	4.70	5.00	4.80	0.65	0.95	0.50	0.60	0.35	1.00	0.60
	multivariate	0.55	3.80	5.30	4.90	5.80	5.45	4.50	0.15	0.45	0.35	0.75	0.55	1.05	0.70
	Puri & Sen	2.40	4.75	4.90	4.70	4.55	4.80	4.65	0.45	0.95	0.55	0.60	0.35	1.10	0.60
	ATS	3.55	5.75	5.05	4.85	4.70	5.05	4.75	3.20	4.00	4.35	4.90	4.15	5.25	3.45
	Koch	1.95	2.60	4.20	4.40	6.35	6.00	5.20	0.55	0.20	0.20	0.65	0.40	1.15	0.75
	GLMM	0.70	0.30	0.40	1.30	0.90	1.40	1.90	0.00	0.00	0.20	0.00	0.10	0.20	0.20
4*5	parametric	5.80	5.85	6.60	5.80	5.40	5.75	6.20	7.35	6.45	6.05	6.20	6.05	6.50	6.65
	par./ HF-corr.	4.30	5.20	6.15	5.40	5.30	5.70	6.20	5.90	6.05	5.65	6.05	6.05	6.20	6.55
	multivariate	4.25	5.85	4.75	5.80	4.95	5.35	5.05	4.40	4.90	4.95	4.70	4.55	4.70	4.00
	Puri & Sen	3.70	4.90	5.90	5.20	5.25	5.50	6.10	5.25	5.70	5.40	5.95	5.95	6.05	6.35
	ATS	2.45	2.85	3.65	3.95	3.75	4.00	4.65	4.55	3.35	3.60	3.35	4.60	4.60	4.40
	Koch	2.05	3.75	4.90	6.15	5.50	5.70	7.00	3.20	4.45	5.30	5.25	5.70	6.90	6.70
	GLMM	0.00	0.00	0.00	0.30	0.80	1.40	2.00	0.81	0.81	0.81	0.81	0.91	1.31	1.81


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 9. 1. 3 p = 0.9

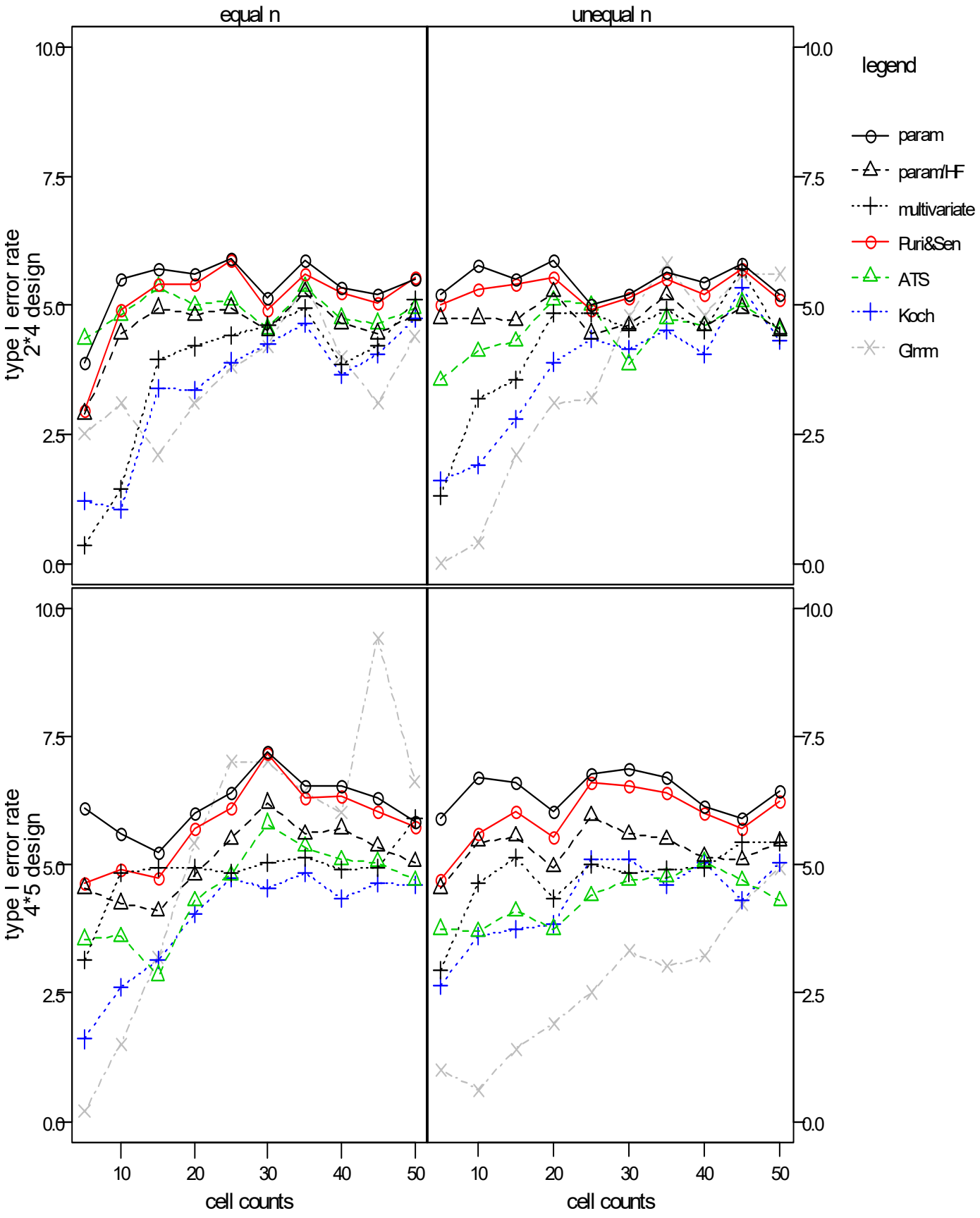
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	2.05	4.35	5.00	5.45	4.30	5.70	5.20	0.35	0.25	0.05	0.35	0.15	0.15	0.30
	par./ HF-corr.	1.70	3.35	4.00	4.65	4.15	5.35	4.70	0.15	0.10		0.25	0.15	0.15	0.25
	multivariate	0.10	2.10	3.45	5.25	5.25	6.15	4.80	0.10	0.05	0.15	0.15	0.20	0.15	0.25
	Puri & Sen	1.00	3.15	4.30	4.85	4.10	5.45	5.00	0.55	0.25	0.30	0.25	0.30	0.20	0.50
	ATS	2.30	3.50	4.35	4.80	4.15	5.45	4.70	2.35	3.70	3.80	4.60	4.20	4.45	4.20
	Koch	3.35	1.80	3.00	4.90	5.40	6.55	5.45	1.75	0.05	0.15	0.15	0.20	0.15	0.30
	GLMM	3.10	0.40	0.40	0.50	0.30	0.20	1.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00
4*5	parametric	7.60	8.50	7.90	6.95	6.90	7.10	7.55	7.90	7.70	7.70	8.20	7.70	7.20	6.90
	par./ HF-corr.	5.00	7.10	7.15	6.50	6.10	6.60	7.25	6.05	6.30	6.90	7.40	7.50	6.95	6.65
	multivariate	3.25	5.95	5.20	6.25	5.95	5.45	5.25	2.75	4.50	4.75	5.20	4.70	4.85	4.50
	Puri & Sen	3.85	6.15	6.00	6.15	5.55	6.40	6.55	6.70	6.80	7.15	7.40	7.60	6.90	6.75
	ATS	2.40	2.85	3.45	3.45	3.45	4.40	4.45	2.60	2.10	2.80	2.95	3.80	3.80	3.80
	Koch	4.05	5.05	6.90	7.70	7.00	8.00	7.70	5.55	5.45	6.50	7.50	7.40	6.85	7.35
	GLMM	0.30	0.20	0.20	0.20	0.30	0.60	0.70	0.91	1.01	0.81	0.81	1.01	0.81	0.81


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 9. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

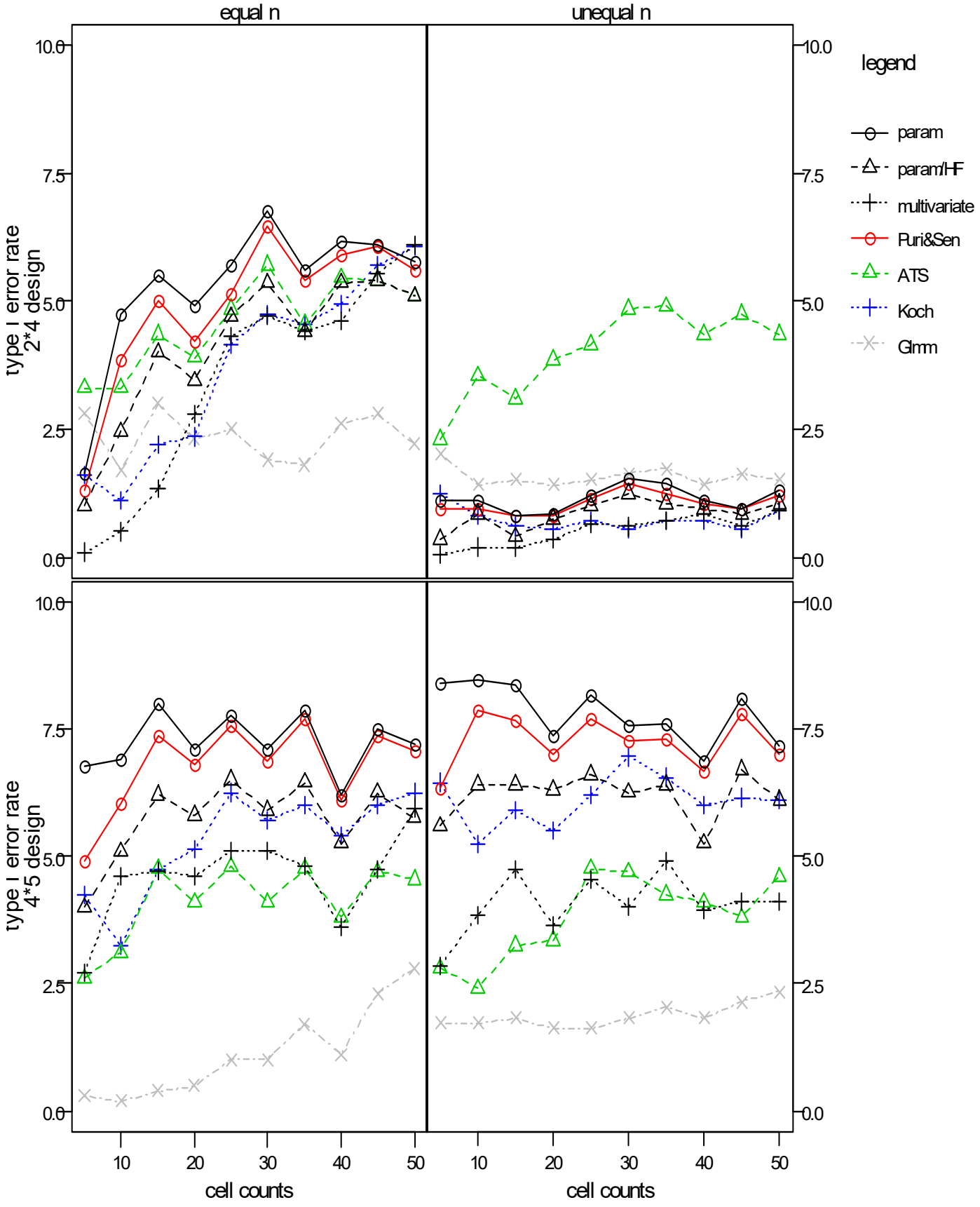
3. 9. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.90	5.50	5.70	5.60	5.15	5.35	5.50	5.20	5.75	5.50	5.85	5.20	5.45	5.20
	par./ HF-corr.	2.90	4.45	4.95	4.80	4.50	4.65	4.80	4.75	4.75	4.70	5.25	4.60	4.60	4.55
	multivariate	0.35	1.45	3.95	4.20	4.60	3.85	5.10	1.30	3.20	3.55	4.85	4.55	4.50	4.40
	Puri & Sen	2.95	4.90	5.40	5.40	4.90	5.25	5.55	5.00	5.30	5.40	5.55	5.15	5.20	5.10
	ATS	4.35	4.80	5.35	5.00	4.55	4.75	4.95	3.55	4.10	4.30	5.10	3.85	4.60	4.50
	Koch	1.20	1.05	3.40	3.35	4.25	3.65	4.75	1.60	1.90	2.80	3.90	4.15	4.05	4.30
	GLMM	2.50	3.10	2.10	3.10	4.20	4.00	4.40	0.00	0.40	2.10	3.10	4.80	4.80	5.60
4*5	parametric	6.10	5.60	5.25	6.00	7.20	6.55	5.85	5.90	6.70	6.60	6.05	6.85	6.15	6.45
	par./ HF-corr.	4.55	4.25	4.10	4.80	6.20	5.70	5.05	4.55	5.45	5.55	4.95	5.60	5.15	5.45
	multivariate	3.15	4.85	4.95	4.95	5.05	4.90	5.90	2.95	4.65	5.15	4.35	4.85	4.95	5.45
	Puri & Sen	4.65	4.90	4.75	5.70	7.15	6.35	5.75	4.70	5.60	6.05	5.55	6.55	6.00	6.25
	ATS	3.55	3.60	2.85	4.30	5.80	5.10	4.70	3.75	3.70	4.10	3.75	4.70	5.05	4.30
	Koch	1.60	2.60	3.15	4.05	4.55	4.35	4.60	2.65	3.60	3.75	3.85	5.10	5.05	5.05
	GLMM	0.20	1.50	3.21	5.41	7.01	6.01	6.61	1.01	0.60	1.41	1.91	3.32	3.22	4.93


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

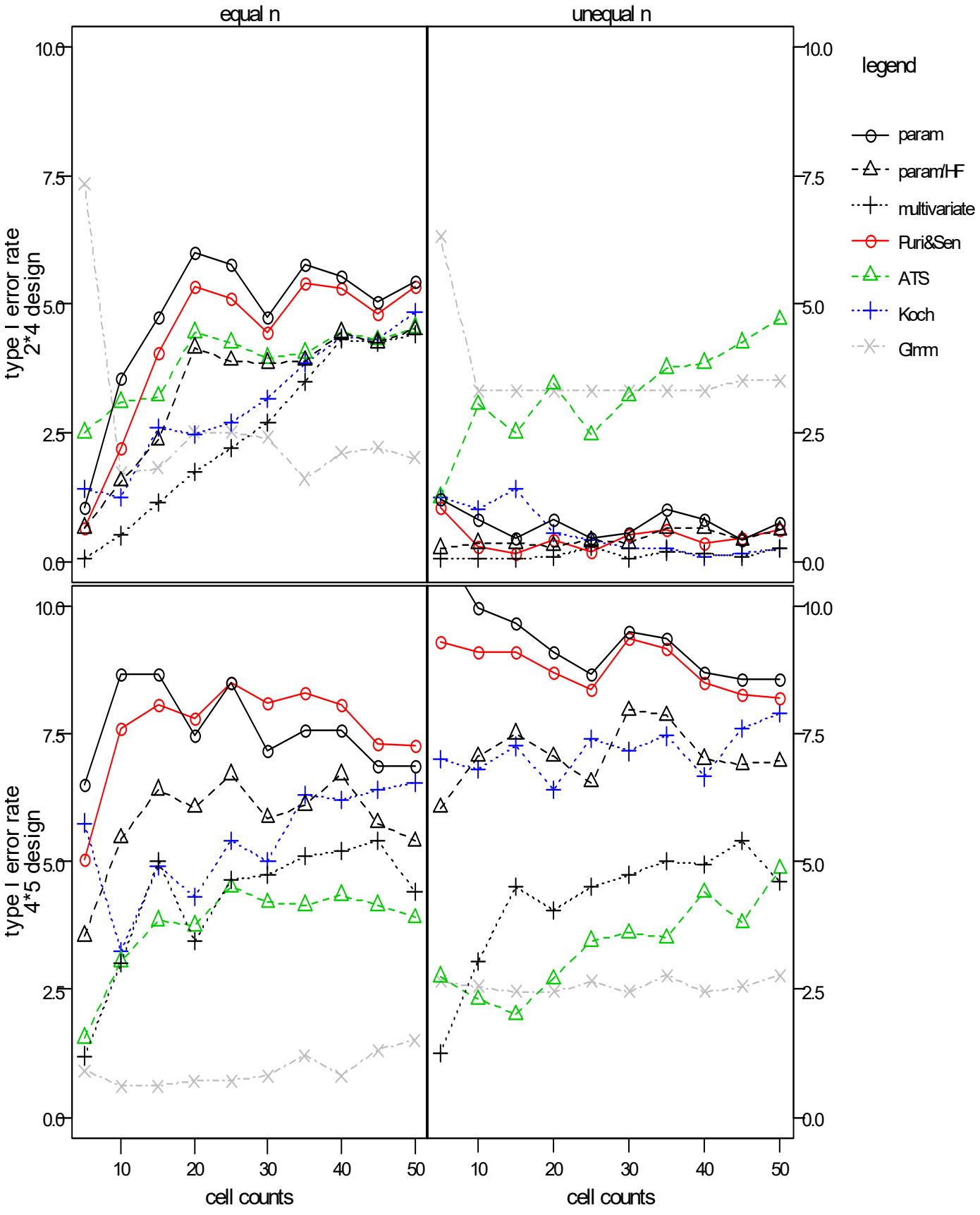
3. 9. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	1.65	4.75	5.50	4.90	6.75	6.15	5.75	1.10	1.10	0.80	0.85	1.55	1.10	1.30
	par./ HF-corr.	1.00	2.45	4.00	3.45	5.35	5.35	5.10	0.35	0.85	0.40	0.75	1.25	0.95	1.05
	multivariate	0.10	0.50	1.35	2.80	4.70	4.60	6.10	0.05	0.20	0.20	0.35	0.60	0.85	0.90
	Puri & Sen	1.30	3.85	5.00	4.20	6.45	5.90	5.60	0.95	0.95	0.80	0.80	1.45	1.05	1.20
	ATS	3.30	3.30	4.35	3.90	5.70	5.45	5.10	2.30	3.55	3.10	3.85	4.85	4.35	4.35
	Koch	1.60	1.10	2.20	2.35	4.75	4.95	6.05	1.25	0.80	0.60	0.55	0.55	0.70	0.90
	GLMM	2.81	1.70	3.01	2.30	1.90	2.61	2.20	2.03	1.42	1.52	1.42	1.62	1.42	1.52
4*5	parametric	6.75	6.90	8.00	7.10	7.10	6.20	7.20	8.40	8.45	8.35	7.35	7.55	6.85	7.15
	par./ HF-corr.	4.00	5.10	6.20	5.80	5.90	5.25	5.75	5.60	6.40	6.40	6.30	6.25	5.25	6.10
	multivariate	2.70	4.60	4.70	4.60	5.10	3.60	5.95	2.85	3.85	4.75	3.65	4.00	3.95	4.10
	Puri & Sen	4.90	6.05	7.35	6.80	6.85	6.10	7.05	6.35	7.85	7.65	7.00	7.25	6.65	7.00
	ATS	2.60	3.10	4.75	4.10	4.10	3.80	4.55	2.80	2.40	3.25	3.35	4.70	4.10	4.60
	Koch	4.25	3.25	4.75	5.15	5.70	5.40	6.25	6.45	5.25	5.90	5.50	6.95	6.00	6.10
	GLMM	0.30	0.20	0.40	0.50	1.00	1.10	2.81	1.73	1.73	1.83	1.63	1.83	1.83	2.34


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 9. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	1.05	3.55	4.75	6.00	4.75	5.55	5.45	1.20	0.80	0.45	0.80	0.55	0.80	0.75
	par./ HF-corr.	0.65	1.55	2.35	4.15	3.85	4.45	4.50	0.25	0.35	0.35	0.30	0.35	0.65	0.60
	multivariate	0.05	0.50	1.15	1.75	2.70	4.30	4.40	0.05	0.05	0.05	0.10	0.05	0.15	0.25
	Puri & Sen	0.65	2.20	4.05	5.35	4.45	5.30	5.35	1.05	0.30	0.15	0.40	0.50	0.35	0.60
	ATS	2.50	3.10	3.20	4.45	3.95	4.45	4.55	1.25	3.05	2.50	3.45	3.20	3.85	4.70
	Koch	1.40	1.25	2.60	2.45	3.15	4.35	4.85	1.25	1.00	1.40	0.55	0.25	0.10	0.25
	GLMM	7.33	1.71	1.81	2.51	2.41	2.11	2.01	6.30	3.31	3.31	3.31	3.31	3.31	3.51
4*5	parametric	6.50	8.65	8.65	7.45	7.15	7.55	6.85	11.20	9.95	9.65	9.10	9.50	8.70	8.55
	par./ HF-corr.	3.55	5.45	6.40	6.05	5.85	6.70	5.40	6.05	7.05	7.50	7.05	7.95	7.00	6.95
	multivariate	1.20	3.00	5.00	3.45	4.75	5.20	4.40	1.25	3.05	4.50	4.05	4.75	4.95	4.60
	Puri & Sen	5.05	7.60	8.05	7.80	8.10	8.05	7.25	9.30	9.10	9.10	8.70	9.35	8.50	8.20
	ATS	1.55	3.05	3.85	3.75	4.20	4.35	3.90	2.75	2.30	2.00	2.70	3.60	4.40	4.85
	Koch	5.75	3.25	4.90	4.30	5.00	6.20	6.55	7.00	6.80	7.25	6.40	7.15	6.65	7.90
	GLMM	0.91	0.60	0.60	0.70	0.80	0.80	1.51	2.66	2.56	2.46	2.46	2.46	2.46	2.76

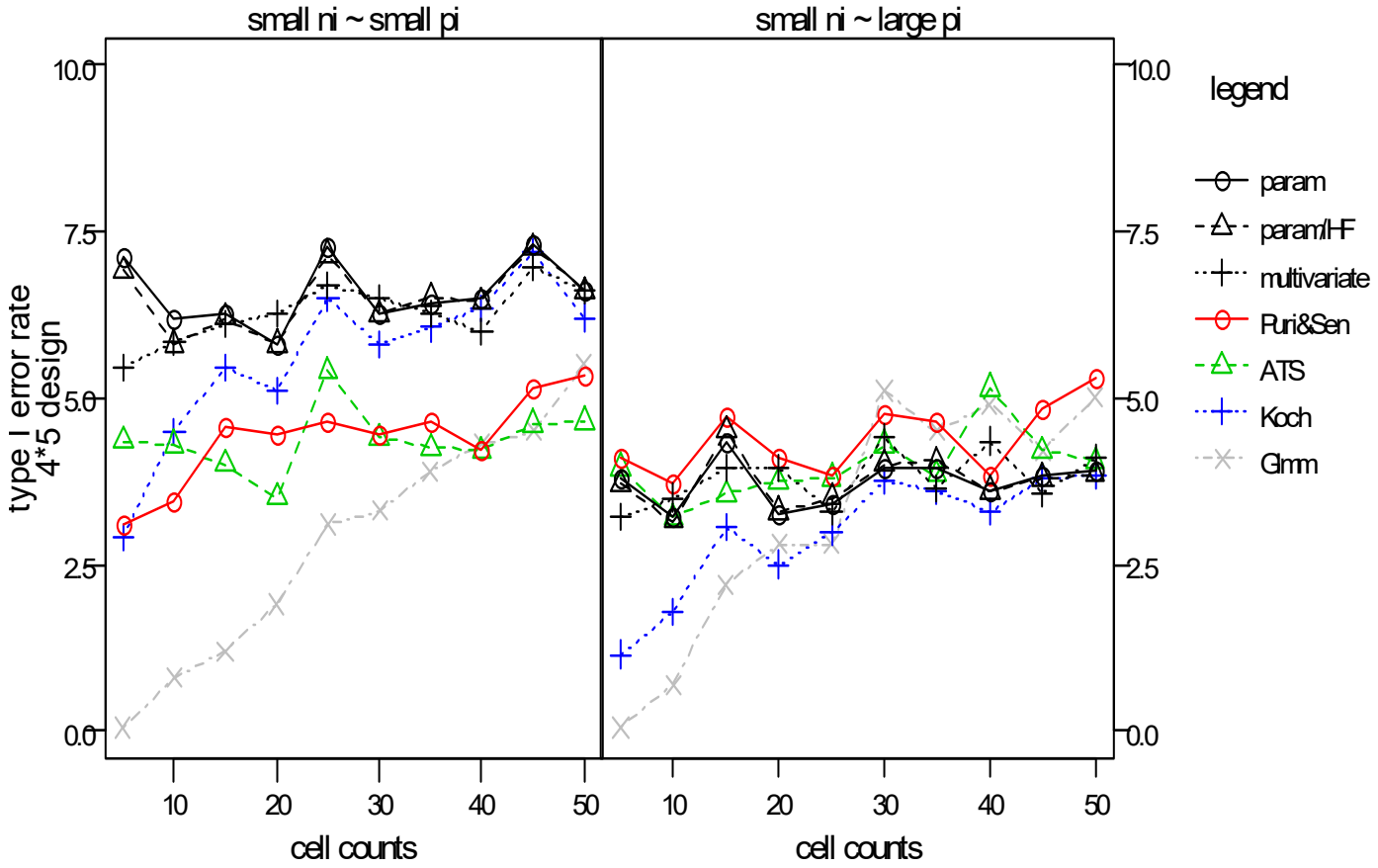

equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 10. Interaction AB - A significant (effects a_i = 0.6*s) small n_i ~ small p_i and small n_i ~ large p_i

3. 10. 1. equal correlations on B (r=0.3)

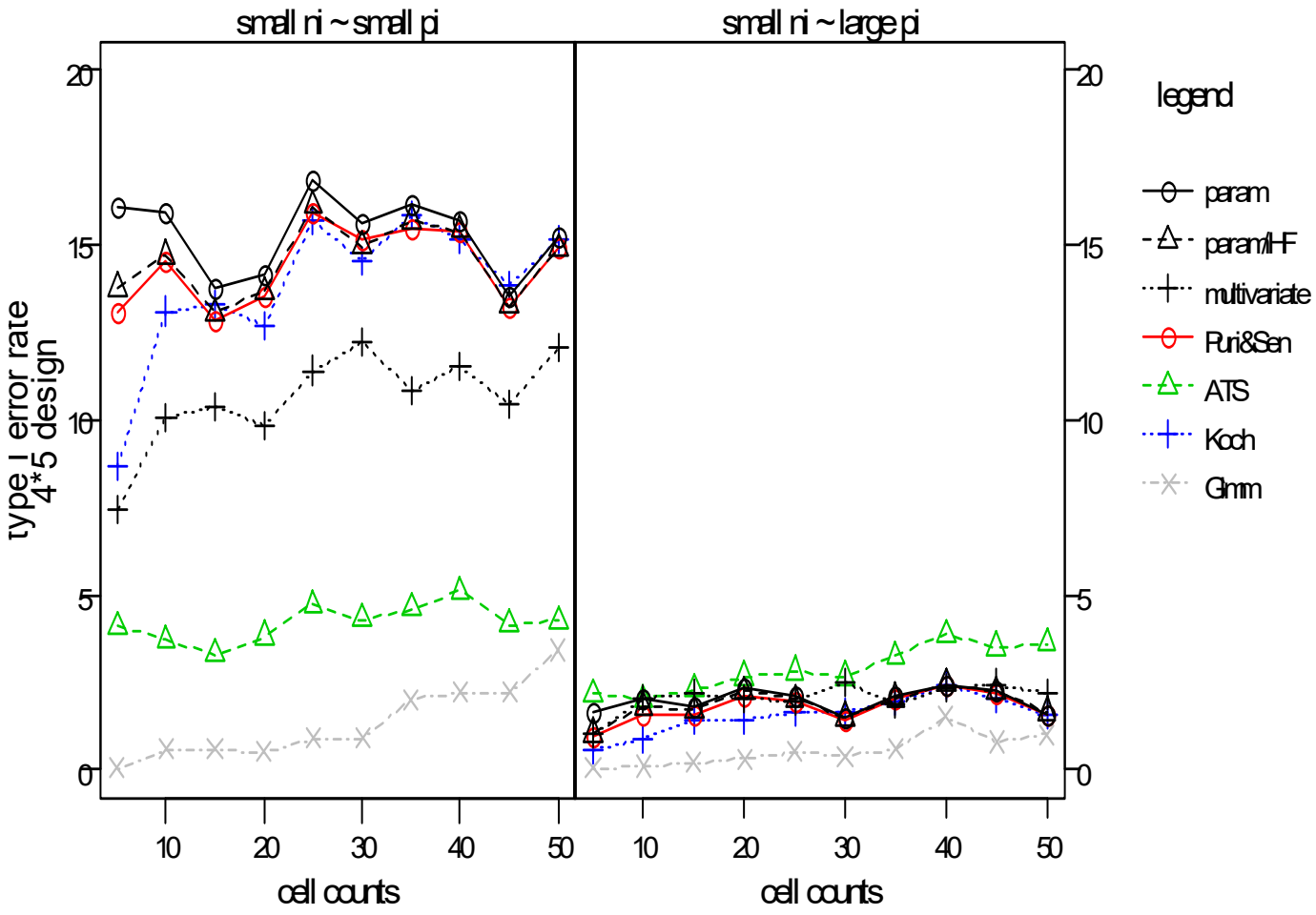
3. 10. 1. 1 p = 0.6

		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	7.10	6.20	6.25	5.80	6.25	6.50	6.60	3.80	3.20	4.35	3.25	3.95	3.60	3.90
	par./ HF-corr.	6.90	5.80	6.20	5.80	6.25	6.45	6.60	3.70	3.15	4.50	3.30	4.00	3.60	3.85
	multivariate	5.45	5.85	6.10	6.25	6.50	6.00	6.60	3.20	3.50	3.95	3.95	4.40	4.35	4.10
	Puri & Sen	5.20	5.30	5.80	5.40	5.95	6.30	6.55	2.90	2.80	3.95	3.05	3.75	3.55	3.75
	ATS	4.35	4.30	4.00	3.50	4.40	4.20	4.65	3.95	3.20	3.55	3.75	4.30	5.15	4.05
	Koch	2.90	4.50	5.45	5.10	5.80	6.35	6.20	1.15	1.80	3.05	2.50	3.75	3.30	3.85
	GLMM	0.05	0.8	1.2	1.9	3.3	4.3	5.5		0.7	2.2	2.8	5.1	4.9	5.0


small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

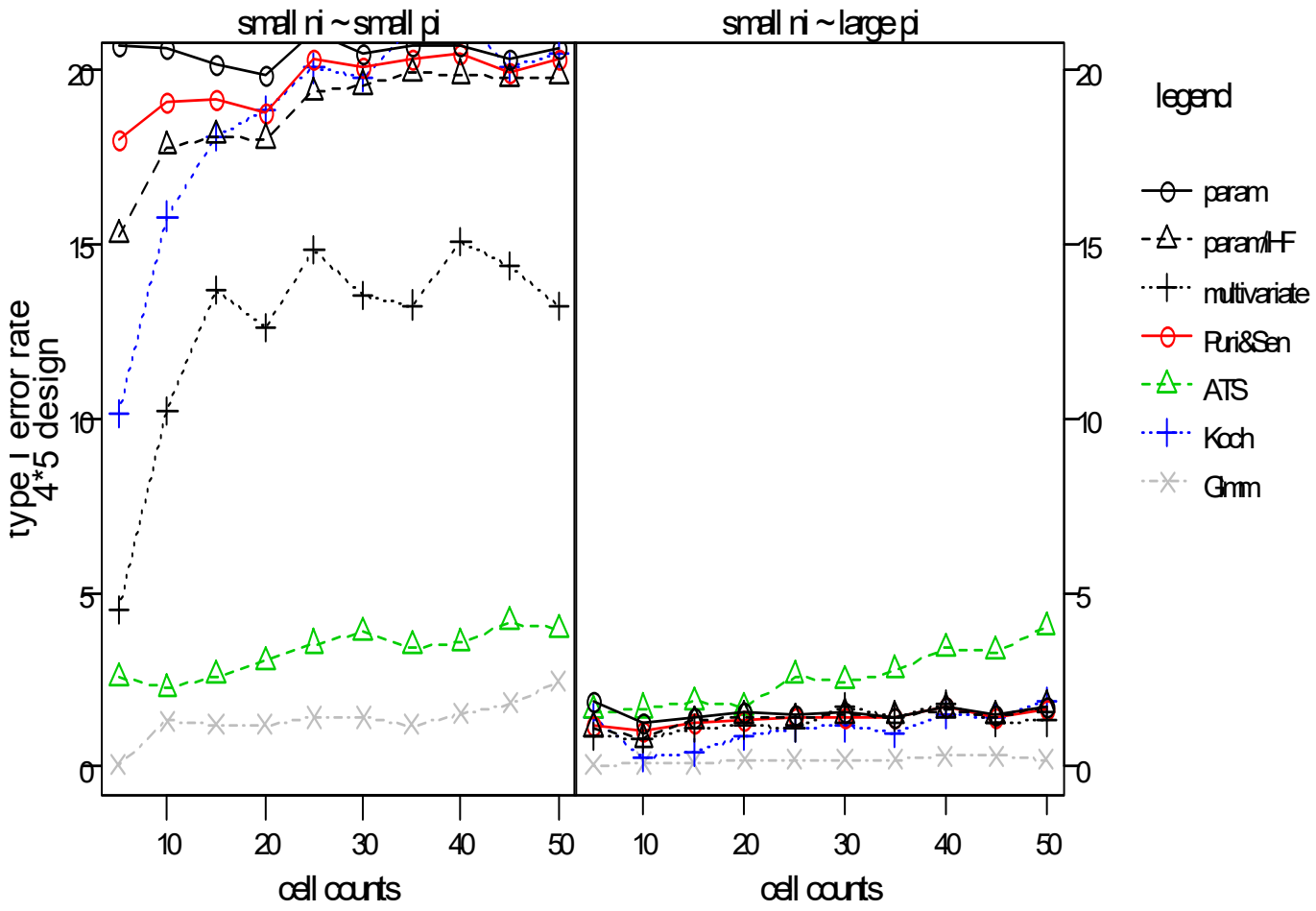
3. 10. 1. 2 p = 0.8

		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	16.10	15.95	13.75	14.15	15.60	15.65	15.20	1.65	2.05	1.8	2.35	1.50	2.45	1.60
	par./ HF-corr.	13.75	14.70	13.05	13.65	14.95	15.40	14.90	1.05	1.80	1.7	2.25	1.50	2.45	1.65
	multivariate	7.45	10.05	10.35	9.80	12.20	11.55	12.05	1.00	2.00	2.2	2.00	2.50	2.35	2.15
	Puri & Sen	13.05	14.50	12.80	13.55	15.15	15.40	14.90	0.95	1.60	1.6	2.10	1.45	2.40	1.60
	ATS	4.10	3.70	3.30	3.80	4.30	5.10	4.25	2.15	2.00	2.3	2.65	2.65	3.85	3.60
	Koch	8.65	13.10	13.30	12.70	14.50	15.15	15.15	0.55	0.85	1.4	1.40	1.65	2.40	1.55
	Glmm Wald II	0.05	0.6	0.6	0.5	0.9	2.2	3.4		0.1	0.2	0.3	0.4	1.5	1.0


small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
cell counts
cell counts
legend
param
paramMHF
multivariate
Puri&Sen
ATS
Koch
Gmm

3. 10. 1. 3 p = 0.9

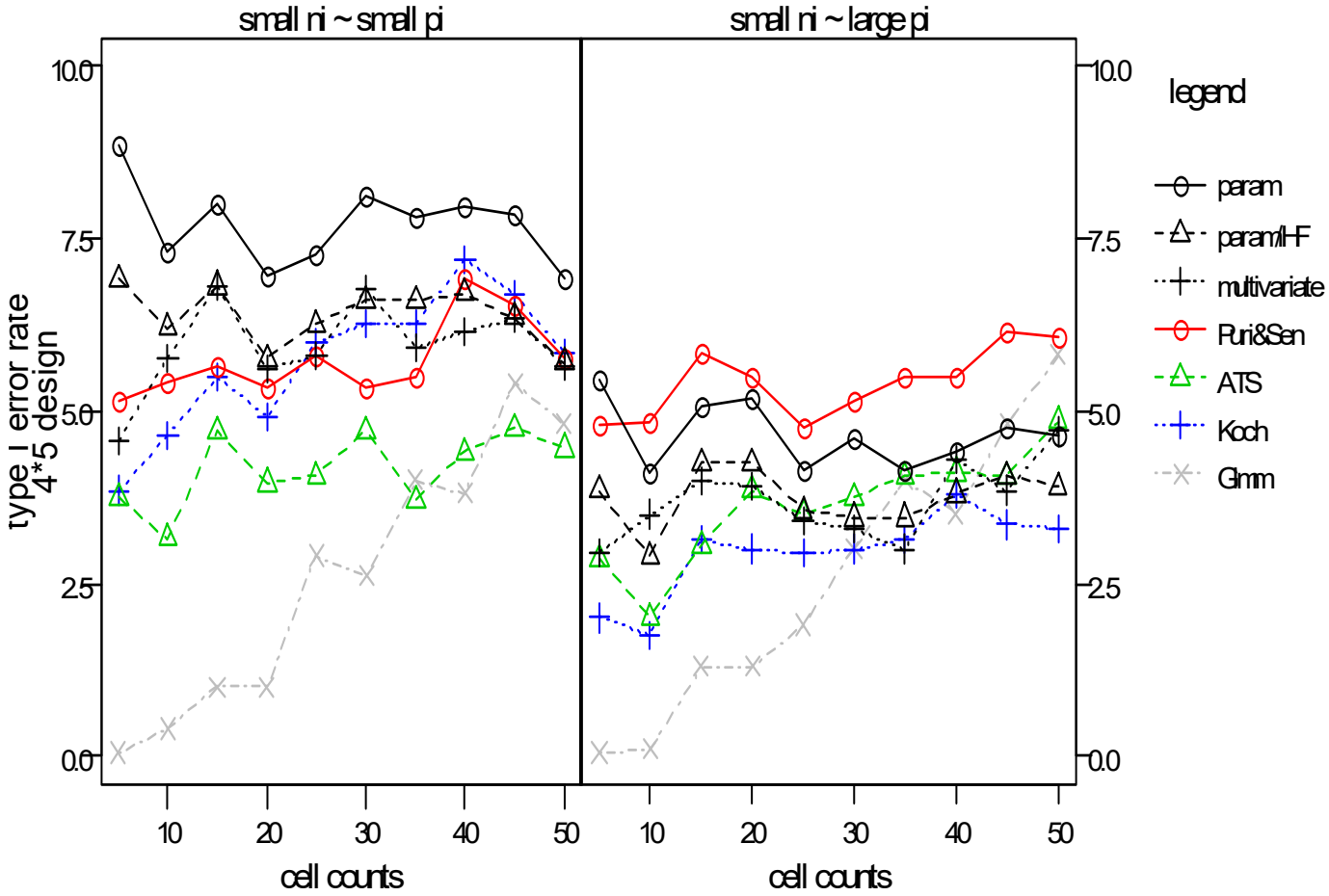
		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	20.70	20.65	20.15	19.85	20.50	20.70	20.65	1.85	1.25	1.40	1.60	1.55	1.75	1.75
	par./ HF-corr.	15.25	17.80	18.10	18.00	19.55	19.85	19.80	1.10	0.80	1.30	1.45	1.50	1.65	1.75
	multivariate	4.50	10.20	13.65	12.60	13.55	15.05	13.20	0.90	0.80	1.10	1.20	1.70	1.80	1.30
	Puri & Sen	18.00	19.05	19.15	18.80	20.10	20.50	20.35	1.20	1.00	1.25	1.30	1.40	1.75	1.65
	ATS	2.55	2.25	2.60	3.00	3.85	3.55	3.95	1.60	1.65	1.85	1.70	2.45	3.40	4.00
	Koch	10.10	15.80	18.10	18.85	19.80	21.55	20.50	1.40	0.25	0.40	0.90	1.15	1.50	1.90
	Glmm Wald II		1.3	1.2	1.2	1.4	1.5	2.4		0.1	0.1	0.2	0.2	0.3	0.2


small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
cell counts
cell counts
legend
param
paramHF
multivariate
Puri&Sen
ATS
Koch
Gmm

3. 10. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

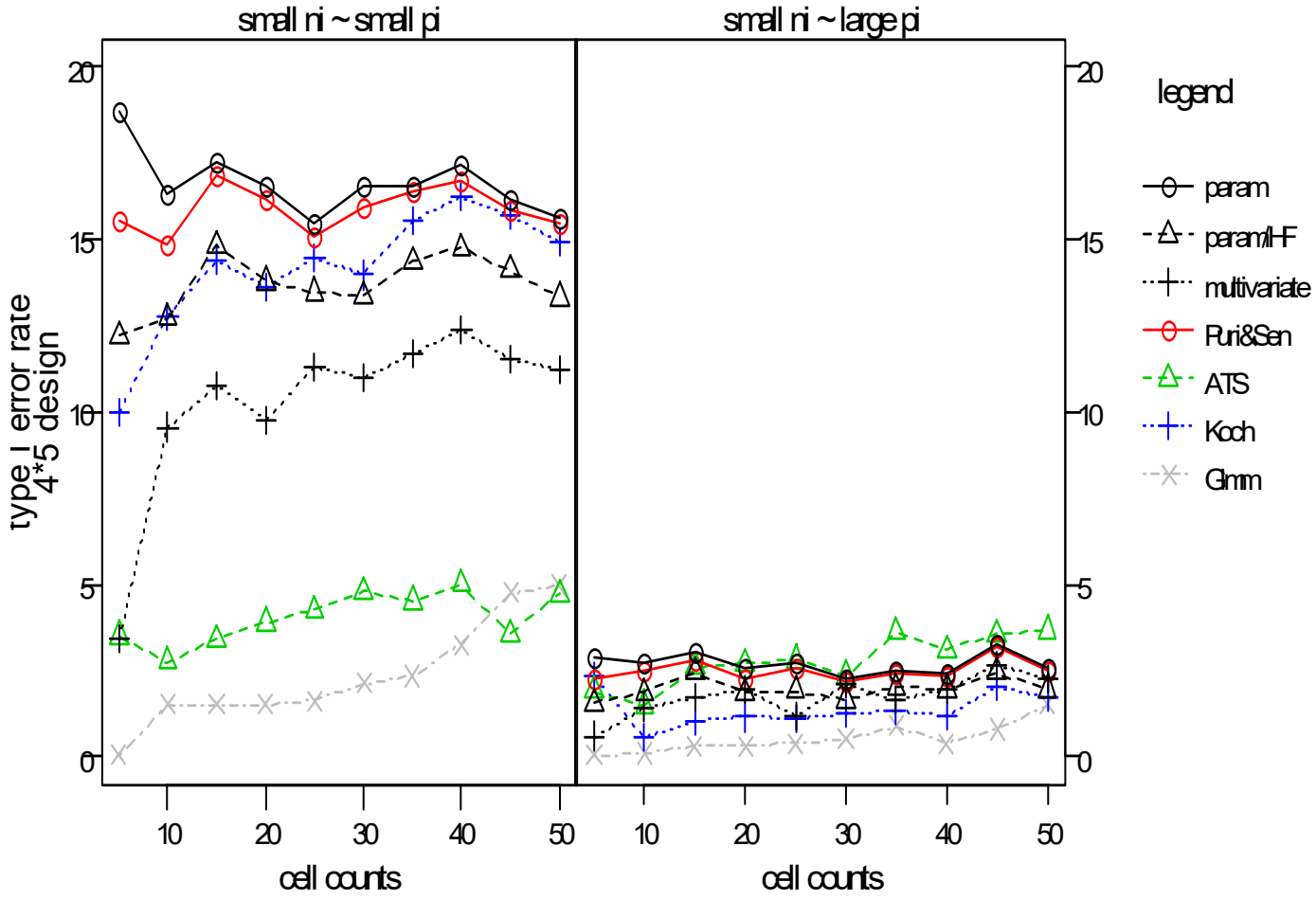
3. 10. 2. 1 p = 0.6

		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	8.85	7.30	8.00	6.95	8.10	7.95	6.90	5.45	4.10	5.05	5.20	4.60	4.4	4.65
	par./ HF-corr.	6.90	6.20	6.80	5.75	6.60	6.70	5.70	3.85	2.90	4.25	4.25	3.45	3.8	3.90
	multivariate	4.55	5.75	6.80	5.60	6.75	6.15	5.65	2.95	3.50	4.00	3.90	3.30	4.3	4.70
	Puri & Sen	6.55	6.55	7.35	6.45	7.90	7.75	6.65	4.25	3.35	4.45	4.95	4.35	4.3	4.50
	ATS	3.75	3.15	4.70	3.95	4.70	4.40	4.45	2.85	2.00	3.05	3.85	3.75	4.1	4.85
	Koch	3.85	4.65	5.50	4.90	6.25	7.20	5.85	2.00	1.75	3.15	3.00	3.00	3.8	3.30
	Glmm Wald II	0.05	0.4	1.0	1.0	2.6	3.8	4.8		0.1	1.3	1.3	3.0	3.5	5.8


small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
paramHF
multivariate
Puri&Sen
ATS
Koch
Gmm

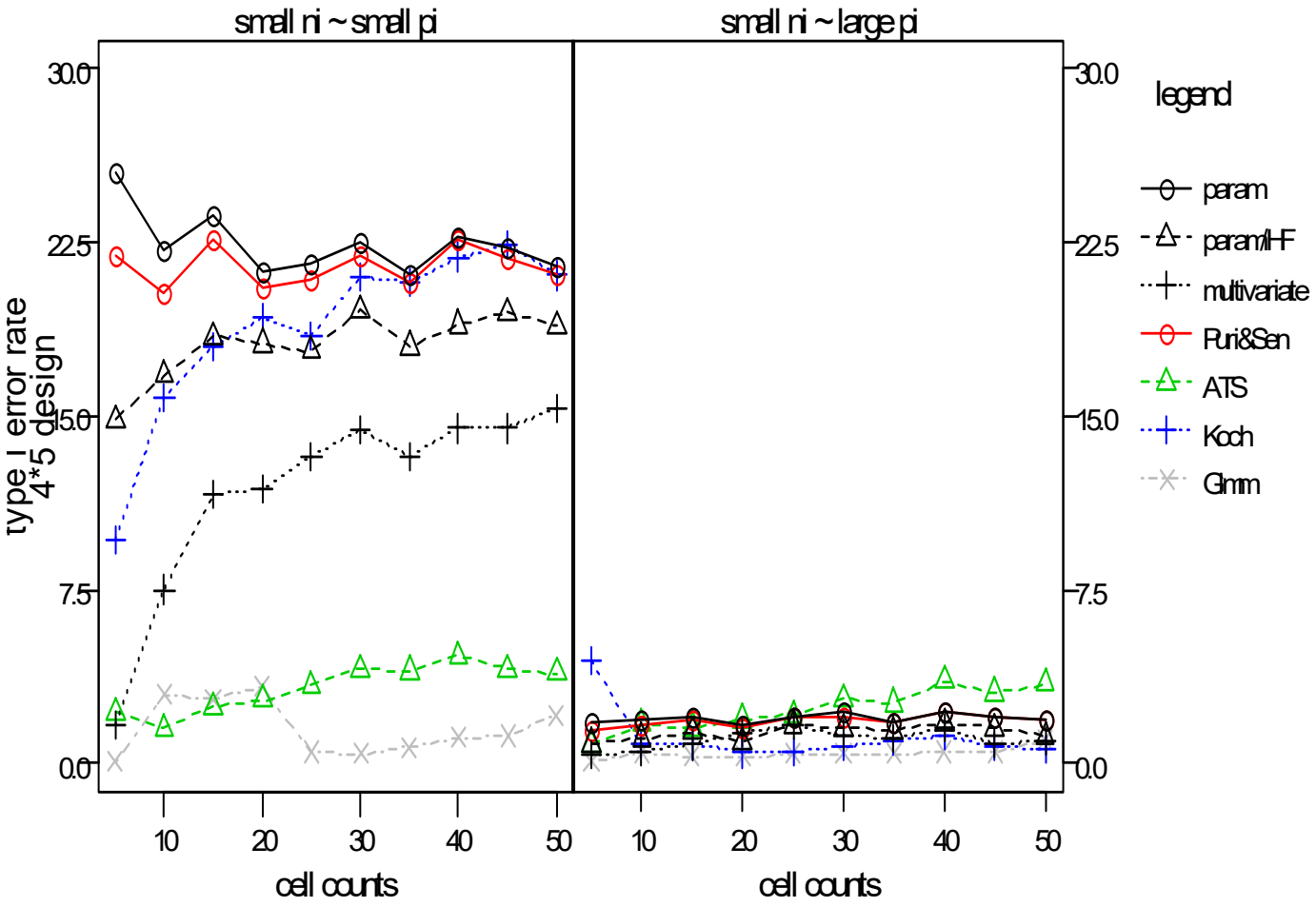
3. 10. 2. 2 p = 0.8

		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	18.7	16.30	17.25	16.50	16.55	17.15	15.60	2.90	2.75	3.05	2.60	2.30	2.40	2.60
	par./ HF-corr.	12.2	12.70	14.80	13.75	13.35	14.75	13.30	1.55	1.85	2.45	1.85	1.65	1.95	1.95
	multivariate	3.4	9.55	10.75	9.75	11.00	12.35	11.20	0.60	1.45	1.70	1.95	2.10	1.95	2.25
	Puri & Sen	15.5	14.80	16.85	16.15	15.95	16.70	15.45	2.25	2.50	2.80	2.30	2.20	2.35	2.50
	ATS	3.5	2.75	3.40	3.90	4.80	5.00	4.70	1.90	1.50	2.60	2.70	2.35	3.10	3.65
	Koch	10.0	12.75	14.35	13.60	13.95	16.25	14.90	2.35	0.55	1.05	1.15	1.25	1.20	1.75
	Glmm Wald II		1.5	1.5	1.5	2.1	3.2	5.0		0.1	0.3	0.3	0.5	0.4	1.5


small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
cell counts
cell counts
legend
param
paramHF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 10. 2. 3 p = 0.9

		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	25.55	22.10	23.70	21.25	22.45	22.75	21.50	1.75	1.90	1.95	1.70	2.20	2.25	1.90
	par./ HF-corr.	14.80	16.75	18.40	18.10	19.55	18.90	18.85	0.85	1.10	1.35	0.95	1.50	1.75	1.15
	multivariate	1.65	7.50	11.65	11.80	14.35	14.45	15.35	0.35	0.50	0.80	1.35	1.25	1.50	1.00
	Puri & Sen	21.90	20.30	22.60	20.55	21.90	22.55	21.05	1.40	1.65	1.85	1.55	2.05	2.25	1.85
	ATS	2.20	1.50	2.45	2.75	4.05	4.65	3.90	0.80	1.70	1.55	1.90	2.80	3.55	3.45
	Koch	9.60	15.80	18.00	19.20	21.00	21.85	21.05	4.45	0.85	0.80	0.45	0.70	1.15	0.65
	Glmm Wald II		3.0	2.8	3.3	0.4	1.1	2.1		0.5	0.3	0.3	0.4	0.5	1.0

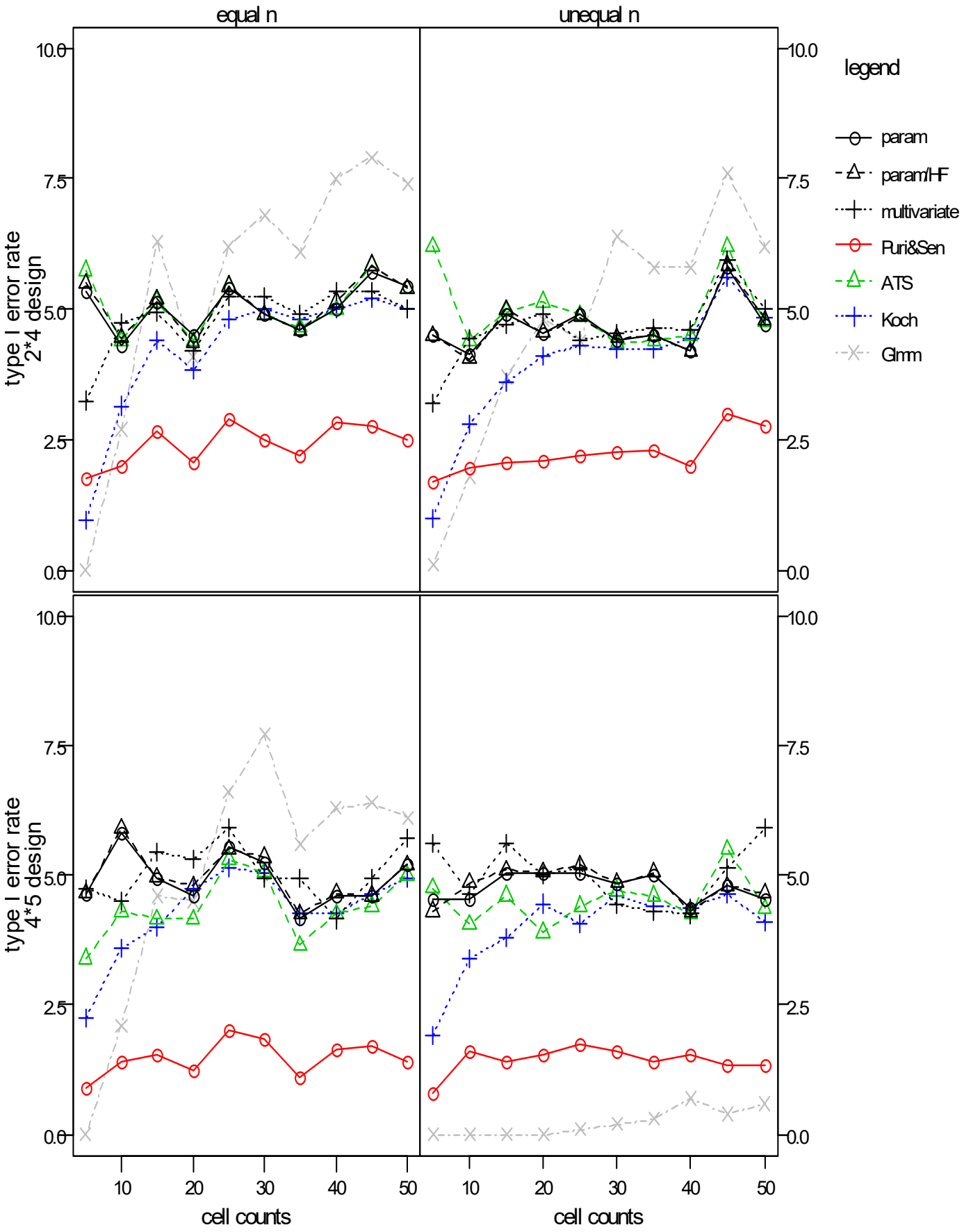

small ni ~ small pi
small ni ~ large pi
type I error rate
4*5 design
30.0
22.5
15.0
7.5
0.0
10
20
30
40
50
cell counts
legend
param
paramHF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 11. Interaction AB - B significant (effects b_i = 0.6*s)

3. 11. 1. equal correlations on B (r=0.3)

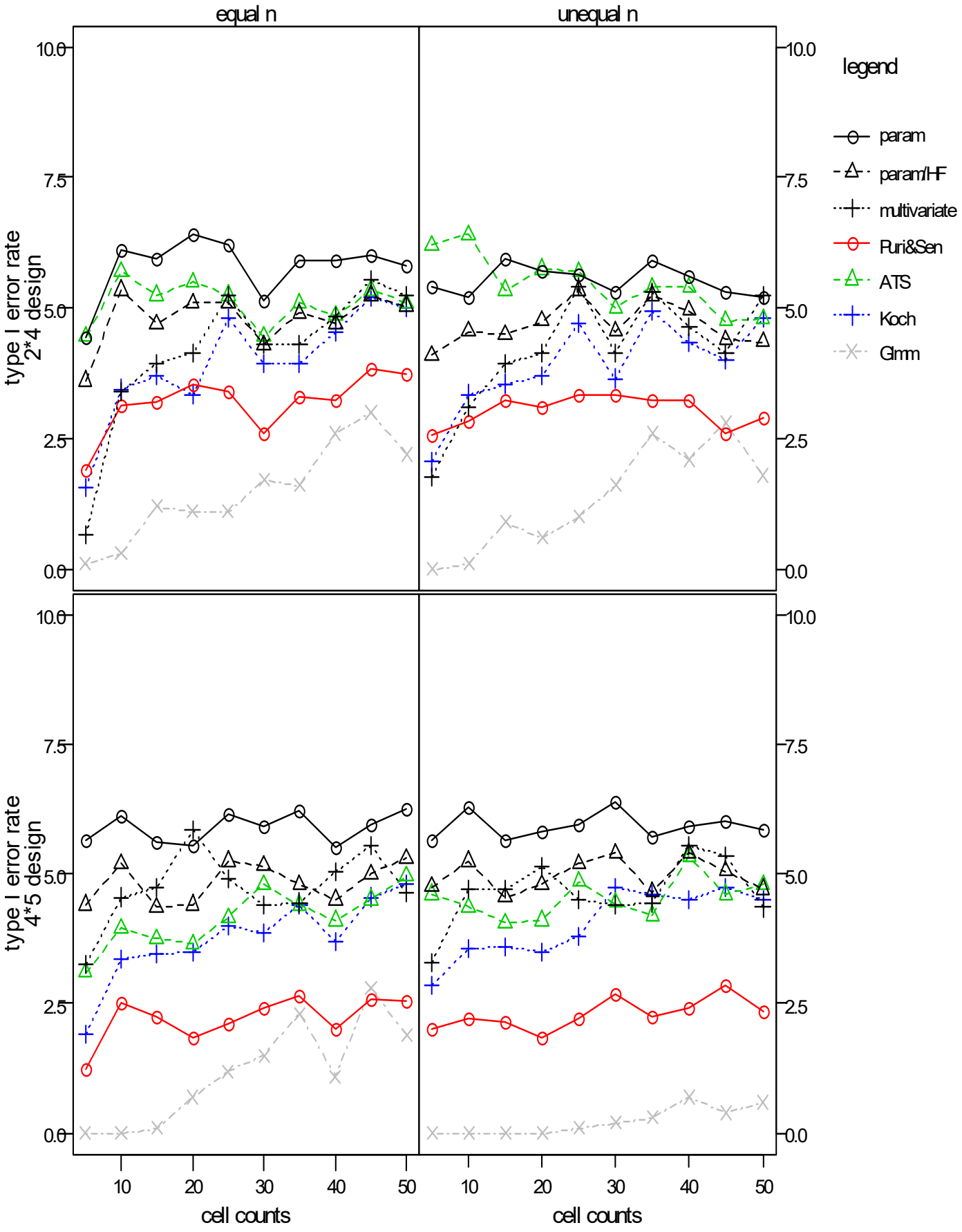
3. 11. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	5.35	4.30	5.15	4.50	4.90	5.00	5.45	4.50	4.15	4.90	4.55	4.40	4.20	4.70
	par./ HF-corr.	5.50	4.45	5.20	4.35	4.90	5.15	5.40	4.50	4.05	5.00	4.55	4.45	4.20	4.80
	multivariate	3.25	4.75	4.95	4.20	5.25	5.35	5.00	3.20	4.45	4.70	4.90	4.55	4.60	5.00
	Puri & Sen	1.75	2.00	2.65	2.05	2.50	2.85	2.50	1.70	1.95	2.05	2.10	2.25	2.00	2.75
	ATS	5.75	4.40	5.15	4.40	4.90	5.00	5.40	6.20	4.40	4.95	5.15	4.35	4.50	4.75
	Koch	0.95	3.15	4.40	3.85	5.00	5.00	5.00	1.00	2.80	3.60	4.10	4.25	4.45	4.85
	GLMM	0.00	2.70	6.30	4.10	6.80	7.50	7.40	0.10	1.80	3.70	4.80	6.40	5.80	6.20
4*5	parametric	4.65	5.80	4.95	4.60	5.25	4.60	5.20	4.55	4.55	5.05	5.05	4.85	4.35	4.55
	par./ HF-corr.	4.65	5.90	4.95	4.80	5.35	4.65	5.20	4.30	4.85	5.10	5.05	4.85	4.30	4.65
	multivariate	4.75	4.50	5.45	5.30	4.95	4.15	5.70	5.60	4.65	5.60	5.00	4.45	4.25	5.90
	Puri & Sen	0.90	1.40	1.55	1.25	1.85	1.65	1.40	0.80	1.60	1.40	1.55	1.60	1.55	1.35
	ATS	3.40	4.30	4.15	4.15	5.05	4.25	5.00	4.75	4.05	4.60	3.90	4.70	4.25	4.35
	Koch	2.25	3.60	4.00	4.75	5.05	4.25	4.95	1.90	3.40	3.80	4.45	4.60	4.35	4.10
	GLMM	0.00	2.10	4.60	4.50	7.70	6.30	6.10	0.00	0.00	0.00	0.00	0.20	0.70	0.60


equal n
unequal n
type I error rate 2*4 design
type I error rate 4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

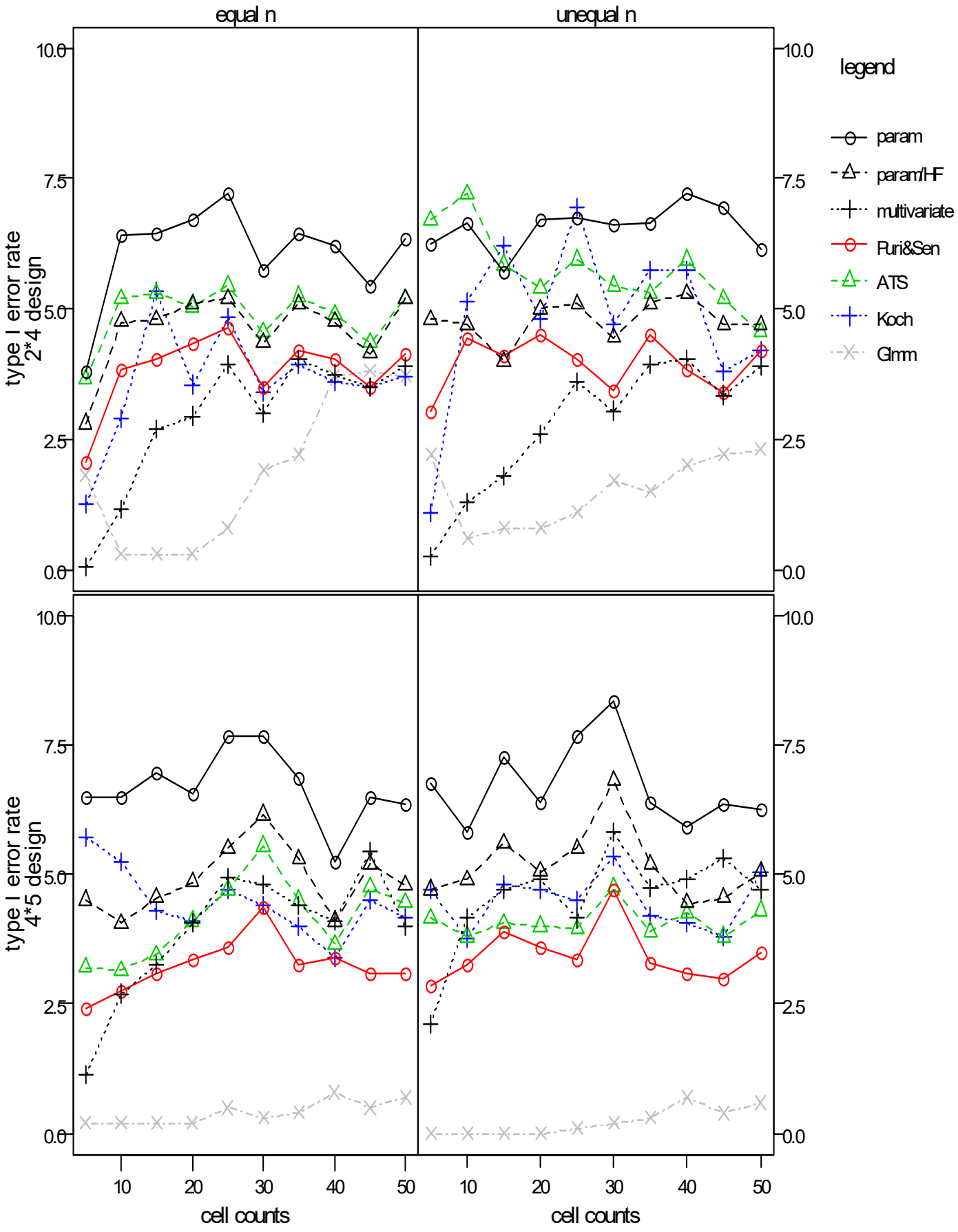
3. 11. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	4.45	6.10	5.95	6.40	5.15	5.90	5.80	5.40	5.20	5.95	5.70	5.30	5.60	5.20
	par./ HF-corr.	3.60	5.35	4.70	5.10	4.30	4.70	5.05	4.10	4.55	4.50	4.75	4.55	4.95	4.35
	multivariate	0.65	3.40	3.95	4.15	4.30	4.85	5.25	1.75	3.10	3.95	4.15	4.15	4.65	5.25
	Puri & Sen	1.90	3.15	3.20	3.55	2.60	3.25	3.75	2.55	2.85	3.25	3.10	3.35	3.25	2.90
	ATS	4.45	5.70	5.25	5.50	4.45	4.85	5.10	6.20	6.40	5.35	5.75	5.00	5.40	4.80
	Koch	1.55	3.45	3.70	3.35	3.95	4.55	5.00	2.05	3.35	3.55	3.70	3.65	4.35	4.80
	GLMM	0.10	0.30	1.20	1.10	1.70	2.60	2.20	0.00	0.10	0.90	0.60	1.60	2.10	1.80
4*5	parametric	5.65	6.10	5.60	5.55	5.90	5.50	6.25	5.65	6.30	5.65	5.80	6.40	5.90	5.85
	par./ HF-corr.	4.40	5.20	4.35	4.40	5.15	4.50	5.30	4.75	5.25	4.55	4.80	5.40	5.40	4.70
	multivariate	3.25	4.55	4.75	5.85	4.40	5.05	4.65	3.30	4.70	4.70	5.15	4.40	5.55	4.35
	Puri & Sen	1.25	2.50	2.25	1.85	2.40	2.00	2.55	2.00	2.20	2.15	1.85	2.70	2.40	2.35
	ATS	3.10	3.95	3.75	3.65	4.80	4.10	4.95	4.60	4.35	4.05	4.10	4.45	5.35	4.80
	Koch	1.90	3.35	3.45	3.50	3.85	3.70	4.80	2.85	3.55	3.60	3.50	4.75	4.50	4.50
	GLMM	0.00	0.00	0.10	0.70	1.50	1.10	0.00	0.00	0.00	0.00	0.20	0.70	0.60	0.00


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 11. 1. 3 p = 0.9

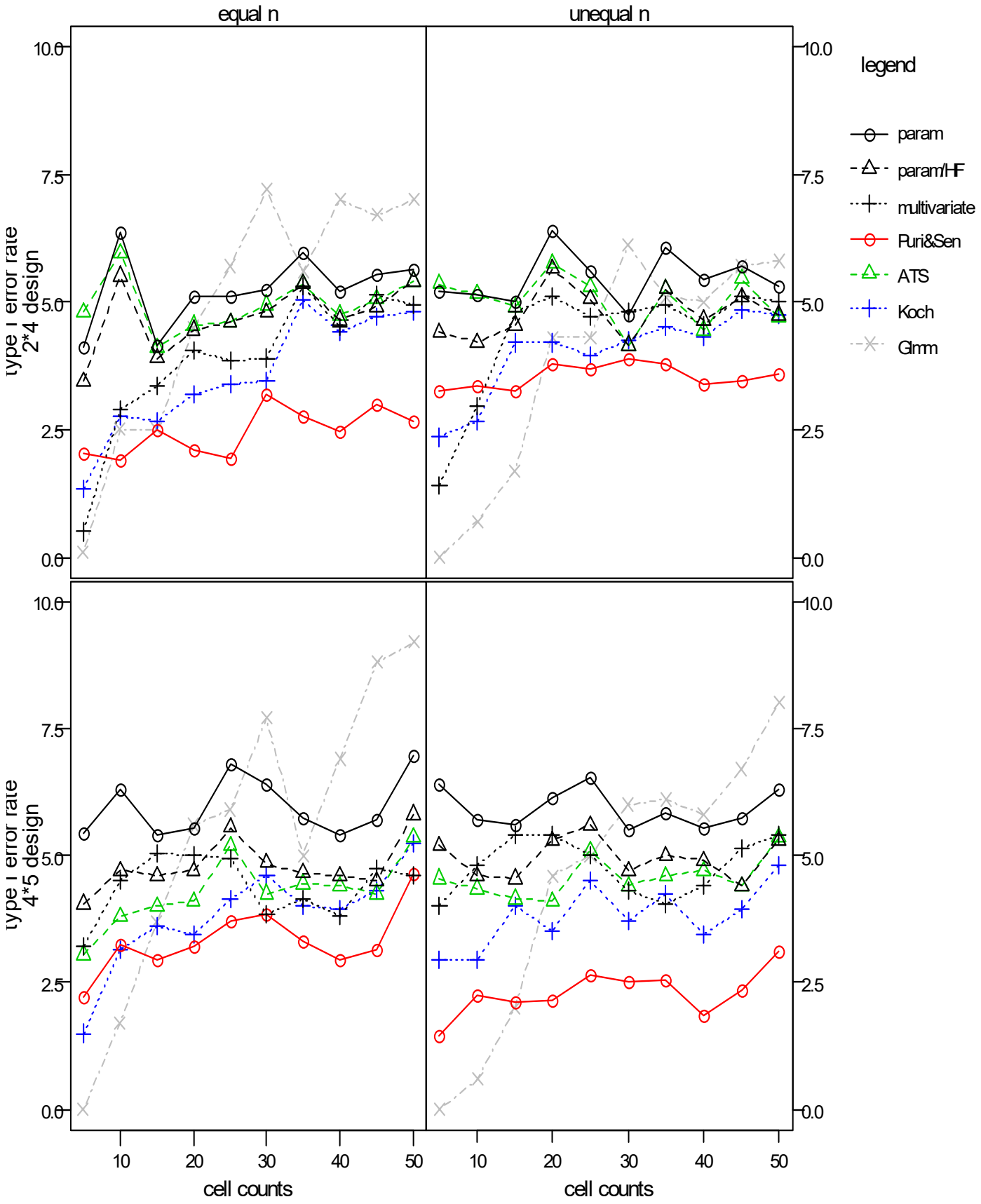
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.80	6.40	6.45	6.70	5.75	6.20	6.35	6.25	6.65	5.70	6.70	6.60	7.20	6.15
	par./ HF-corr.	2.80	4.75	4.80	5.10	4.35	4.75	5.20	4.80	4.70	4.00	5.00	4.45	5.30	4.70
	multivariate	0.05	1.15	2.70	2.95	3.00	3.75	3.90	0.25	1.30	1.80	2.60	3.05	4.05	3.90
	Puri & Sen	2.05	3.85	4.05	4.35	3.50	4.05	4.15	3.05	4.45	4.10	4.50	3.45	3.85	4.20
	ATS	3.65	5.20	5.30	5.05	4.55	4.90	5.20	6.70	7.20	5.85	5.40	5.45	5.95	4.55
	Koch	1.25	2.90	5.35	3.55	3.40	3.60	3.70	1.10	5.15	6.20	4.80	4.70	5.75	4.20
	GLMM	1.81	0.30	0.30	0.30	1.91	3.71	3.71	2.21	0.60	0.80	0.80	1.71	2.01	2.31
4*5	parametric	6.50	6.50	6.95	6.55	7.65	5.25	6.35	6.75	5.80	7.25	6.40	8.35	5.90	6.25
	par./ HF-corr.	4.50	4.05	4.55	4.85	6.15	4.10	4.80	4.70	4.90	5.60	5.05	6.80	4.45	5.05
	multivariate	1.15	2.70	3.25	4.05	4.80	4.10	4.00	2.10	4.15	4.70	4.90	5.80	4.90	4.70
	Puri & Sen	2.40	2.75	3.10	3.35	4.35	3.40	3.10	2.85	3.25	3.90	3.60	4.70	3.10	3.50
	ATS	3.20	3.15	3.45	4.10	5.55	3.65	4.45	4.15	3.80	4.05	4.00	4.75	4.25	4.30
	Koch	5.70	5.25	4.30	4.10	4.40	3.40	4.15	4.70	3.75	4.80	4.70	5.35	4.05	5.05
	GLMM	0.20	0.20	0.20	0.20	0.30	0.80	0.70	0.00	0.00	0.00	0.00	0.20	0.70	0.60


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 11. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2) (effects b_i = 0.3*s)

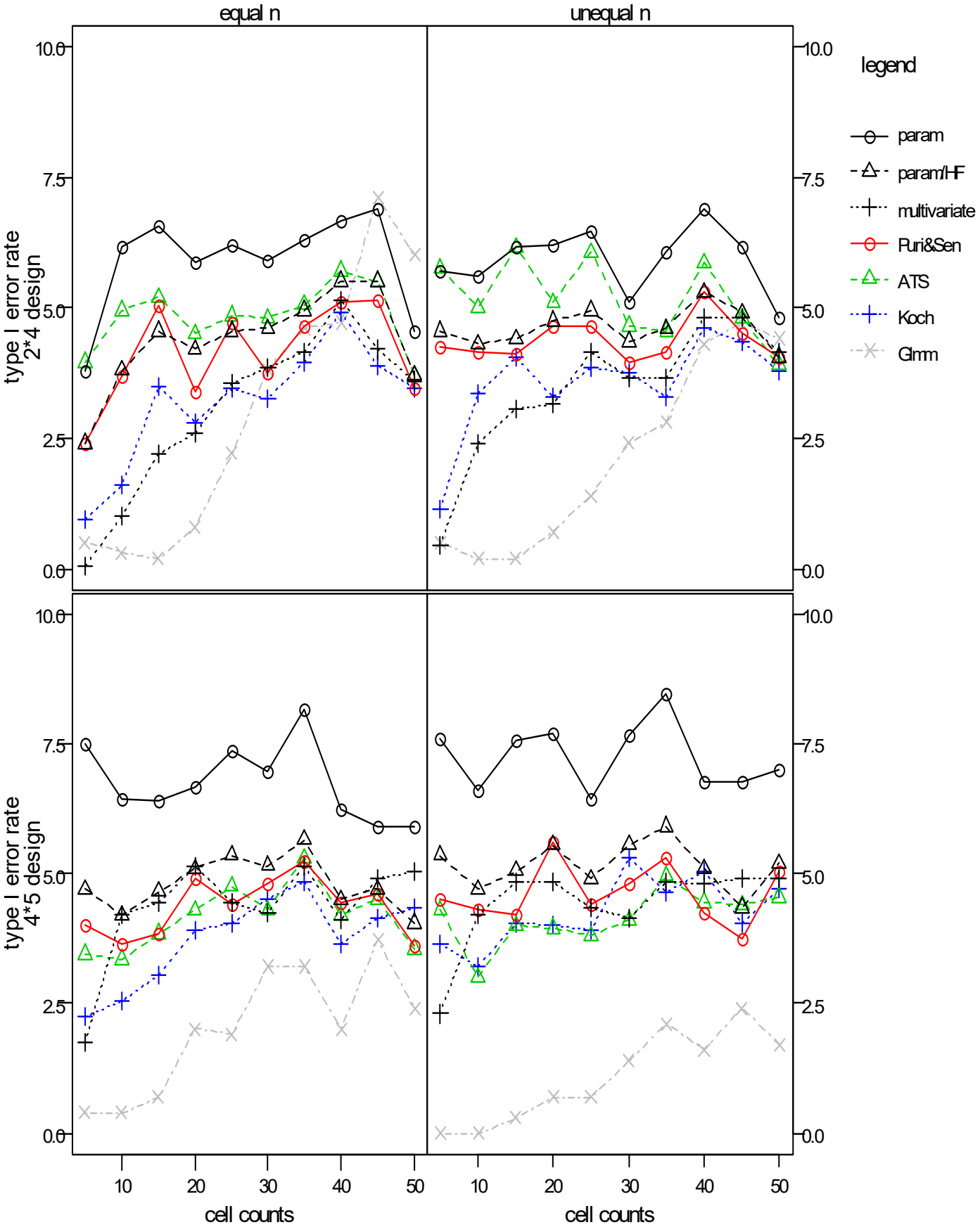
3. 11. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	4.10	6.35	4.15	5.10	5.25	5.20	5.65	5.20	5.15	5.00	6.40	4.75	5.45	5.30
	par./ HF-corr.	3.45	5.50	3.90	4.45	4.80	4.65	5.40	4.40	4.20	4.55	5.65	4.15	4.65	4.75
	multivariate	0.50	2.90	3.35	4.05	3.90	4.50	4.95	1.40	2.95	4.80	5.10	4.80	4.55	5.00
	Puri & Sen	2.05	1.90	2.50	2.10	3.20	2.45	2.65	3.25	3.35	3.25	3.80	3.90	3.40	3.60
	ATS	4.80	5.95	4.10	4.55	4.95	4.75	5.40	5.35	5.15	4.90	5.75	4.15	4.45	4.70
	Koch	1.35	2.75	2.65	3.20	3.45	4.40	4.80	2.35	2.65	4.20	4.20	4.25	4.30	4.75
	GLMM	0.10	2.50	2.50	4.50	7.20	7.00	7.00	0.00	0.70	1.70	4.30	6.10	5.00	5.80
4*5	parametric	5.45	6.30	5.40	5.55	6.40	5.40	6.95	6.40	5.70	5.60	6.15	5.50	5.55	6.30
	par./ HF-corr.	4.05	4.70	4.60	4.70	4.85	4.60	5.80	5.20	4.60	4.55	5.30	4.70	4.90	5.30
	multivariate	3.20	4.50	5.05	5.00	3.85	3.80	4.60	4.00	4.80	5.40	5.40	4.30	4.40	5.40
	Puri & Sen	2.20	3.25	2.95	3.20	3.85	2.95	4.65	1.45	2.25	2.10	2.15	2.50	1.85	3.10
	ATS	3.05	3.80	4.00	4.10	4.25	4.40	5.35	4.55	4.35	4.15	4.10	4.40	4.70	5.35
	Koch	1.50	3.15	3.60	3.45	4.60	3.95	5.25	2.95	2.95	4.00	3.50	3.70	3.45	4.80
	GLMM	0.00	1.70	3.70	5.60	7.70	6.90	9.20	0.00	0.60	2.00	4.60	6.00	5.80	8.00


equal n
unequal n
type I error rate
2*4 design
4*5 design
cell counts
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm
0.0
2.5
5.0
7.5
10.0
10
20
30
40
50

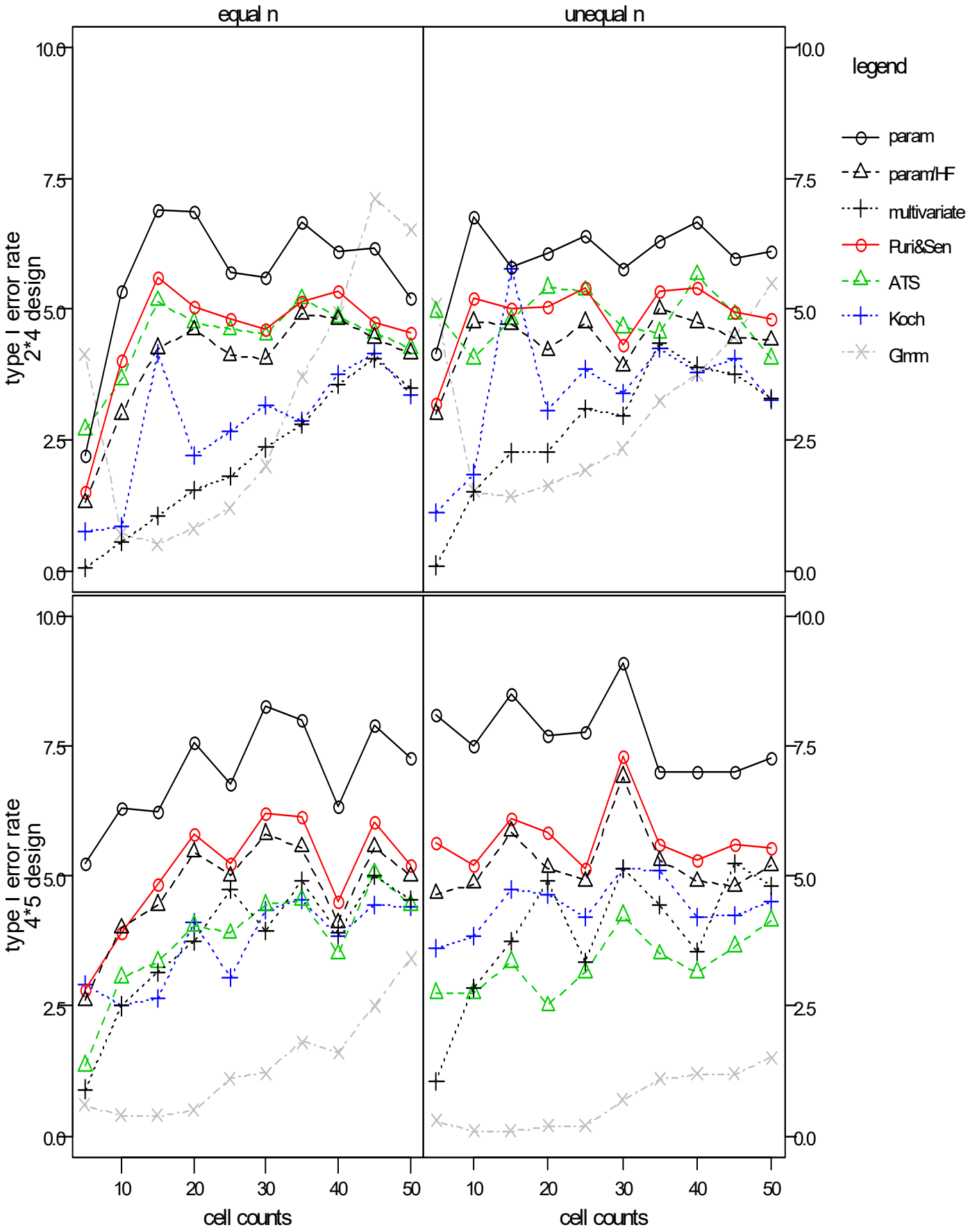
3. 11. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	3.80	6.15	6.55	5.85	5.90	6.65	4.55	5.70	5.60	6.15	6.20	5.10	6.90	4.80
	par./ HF-corr.	2.40	3.80	4.55	4.20	4.60	5.50	3.70	4.55	4.30	4.40	4.75	4.35	5.30	4.05
	multivariate	0.05	1.00	2.20	2.60	3.85	5.15	3.60	0.45	2.40	3.05	3.15	3.65	4.80	4.15
	Puri & Sen	2.40	3.70	5.05	3.40	3.75	5.10	3.45	4.25	4.15	4.10	4.65	3.95	5.30	4.05
	ATS	3.95	4.95	5.20	4.50	4.80	5.70	3.70	5.75	5.00	6.15	5.10	4.65	5.85	3.90
	Koch	0.95	1.60	3.50	2.80	3.25	4.90	3.45	1.15	3.35	4.05	3.30	3.75	4.60	3.80
	GLMM	0.50	0.30	0.20	0.80	3.81	4.71	6.01	0.50	0.20	0.20	0.70	2.40	4.31	4.41
4*5	parametric	7.50	6.45	6.40	6.65	6.95	6.25	5.90	7.60	6.60	7.55	7.70	7.65	6.75	7.00
	par./ HF-corr.	4.70	4.20	4.65	5.10	5.15	4.50	4.05	5.35	4.70	5.05	5.55	5.55	5.10	5.20
	multivariate	1.75	4.20	4.45	5.15	4.25	4.10	5.05	2.30	4.20	4.85	4.85	4.15	4.80	4.90
	Puri & Sen	4.00	3.65	3.85	4.90	4.80	4.45	3.60	4.50	4.30	4.20	5.60	4.80	4.25	5.05
	ATS	3.45	3.35	3.85	4.30	4.30	4.20	3.55	4.30	3.00	4.00	3.95	4.10	4.45	4.55
	Koch	2.25	2.55	3.05	3.90	4.50	3.65	4.35	3.65	3.20	4.05	4.00	5.30	5.05	4.70
	GLMM	0.40	0.40	0.70	2.01	3.21	2.01	2.41	0.00	0.00	0.30	0.70	1.40	1.60	1.70


equal n
unequal n
type I error rate
2*4 design
type I error rate
4*5 design
10.0
7.5
5.0
2.5
0.0
10
20
30
40
50
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 11. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	2.20	5.35	6.90	6.85	5.60	6.10	5.20	4.15	6.75	5.80	6.05	5.75	6.65	6.10
	par./ HF-corr.	1.30	3.00	4.25	4.60	4.05	4.80	4.15	3.00	4.75	4.70	4.20	3.90	4.75	4.40
	multivariate	0.05	0.55	1.05	1.55	2.35	3.55	3.50	0.10	1.50	2.25	2.25	2.95	3.90	3.30
	Puri & Sen	1.50	4.00	5.60	5.05	4.60	5.35	4.55	3.20	5.20	5.00	5.05	4.30	5.40	4.80
	ATS	2.70	3.65	5.15	4.75	4.50	4.85	4.25	4.95	4.05	4.80	5.40	4.65	5.65	4.05
	Koch	0.75	0.85	4.15	2.20	3.15	3.75	3.35	1.10	1.85	5.75	3.05	3.40	3.80	3.25
	GLMM	4.12	0.70	0.50	0.80	2.00	4.90	6.51	5.07	1.52	1.42	1.62	2.33	3.75	5.48
4*5	parametric	5.25	6.30	6.25	7.55	8.25	6.35	7.25	8.10	7.50	8.50	7.70	9.10	7.00	7.25
	par./ HF-corr.	2.60	4.00	4.45	5.45	5.80	4.10	5.00	4.65	4.85	5.85	5.15	6.90	4.90	5.20
	multivariate	0.90	2.50	3.15	3.75	3.95	3.90	4.55	1.05	2.85	3.75	4.90	5.15	3.55	4.80
	Puri & Sen	2.80	3.90	4.85	5.80	6.20	4.50	5.20	5.65	5.20	6.10	5.85	7.30	5.30	5.55
	ATS	1.35	3.05	3.35	4.05	4.45	3.50	4.45	2.75	2.75	3.35	2.50	4.25	3.15	4.15
	Koch	2.90	2.50	2.65	4.10	4.35	3.85	4.40	3.60	3.85	4.75	4.65	5.15	4.20	4.50
	GLMM	0.60	0.40	0.40	0.50	1.20	1.61	3.41	0.30	0.10	0.10	0.20	0.70	1.20	1.50


equal n
unequal n
type I error rate
2*4 design
4*5 design
cell counts
legend
param
param/HF
multivariate
Puri&Sen
ATS
Koch
Glmm

3. 12. Summary of maximum error rates

Maximum smoothed type I error rates for all methods in all situations, partitioned for designs

- with small and large number of cells,
- with positively correlated and negatively correlated n_i and p_i ,
- with equal and unequal cell counts.

effect model	corr	p	parametric		param/HF		multivariate		Puri & Sen		ATS		Koch		GLMM	
			smll	lrg	smll	lrg	smll	lrg	smll	lrg	smll	lrg	smll	lrg	smll	lrg
A	0.3	.5	5.7	5.7			5.7	5.2	5.5	5.5	11.0	14.8	5.3	5.6	7.5	6.9
		.8	5.4	5.0			5.4	5.3	5.3	4.9	10.9	10.2	5.2	5.0	5.1	4.9
		.9	5.2	5.0			5.2	5.3	5.2	5.0	9.5	6.2	5.4	5.4	5.5	2.1
	ne	.5	5.5	6.4			5.5	5.3	5.3	5.5	11.9	15.5	5.2	5.2	8.8	7.6
		.8	5.4	5.3			5.4	5.2	5.3	5.0	10.5	8.9	5.2	5.2	3.0	2.9
		.9	5.2	5.1			5.2	5.3	5.1	4.8	9.5	6.2	5.6	4.8	9.6	4.5
A (B)	0.3	.5	5.4	5.4			5.4	5.3	5.3	5.2	10.7	13.0	5.3	5.3	7.1	5.7
		.8	5.3	5.5			5.3	5.3	5.2	5.1	11.9	10.9	5.3	5.1	5.8	6.3
		.9	5.3	5.4			5.3	5.3	5.3	5.2	11.2	8.4	5.6	5.2	3.6	3.2
	ne	.5	5.8	5.8			5.8	5.7	5.5	5.5	12.5	14.5	5.6	5.5	9.3	8.8
		.8	5.0	5.3			5.0	5.3	4.8	5.0	11.0	9.0	5.5	5.2	3.3	6.8
		.9	5.0	4.8			5.0	5.1	5.0	4.9	8.9	7.0	5.2	5.2	4.0	2.0
A (AB)	0.3	.5	5.6	5.8			5.6	5.5	5.2	5.2	11.3	14.2	5.5	5.4	3.7	3.9
		.8	5.3	5.5			5.3	5.5	5.2	5.2	11.5	10.3	5.2	5.3	7.3	3.4
		.9	5.1	5.3			5.1	5.3	5.0	5.0	9.6	7.5	5.4	5.4	7.3	5.6
	ne	.5	5.6	5.6			5.6	5.3	5.0	5.2	12.4	14.9	5.2	5.4	6.0	3.3
		.8	5.4	5.3			5.4	5.2	5.3	5.0	10.2	9.9	6.2	6.6	6.0	2.8
		.9	5.2	5.4			5.2	5.2	5.1	5.2	8.1	8.0	6.2	7.1	4.0	2.9
B	0.3	.5	5.3	5.3	5.4	5.4	4.9	5.3	4.9	5.2	5.8	5.2	4.6	4.9	6.3	6.4
		.8	4.9	5.5	4.7	5.4	4.8	5.9	4.8	5.4	4.8	5.4	4.4	5.8	4.2	4.4
		.9	4.9	5.1	4.4	4.7	5.2	5.6	4.8	4.9	4.1	4.6	4.7	5.1	5.8	2.9
	ne	.5	5.7	6.7	5.1	5.7	4.8	5.8	5.5	6.7	5.3	5.7	4.5	5.5	5.6	6.9
		.8	5.4	6.4	4.4	5.5	4.6	5.3	5.2	6.3	4.4	5.5	4.4	5.1	5.9	3.9
		.9	5.4	5.6	4.2	4.5	3.6	4.6	5.1	5.4	4.1	4.3	3.3	4.4	9.9	7.4
B (A)	0.3	.5	5.2	5.7	5.2	5.6	5.3	5.5	5.2	5.5	5.2	5.5	5.0	5.1	6.3	5.6
		.8	5.5	5.4	5.2	5.2	5.7	5.9	5.2	5.3	5.2	5.2	5.1	5.1	5.7	5.2
		.9	5.5	5.6	5.1	5.1	6.2	5.9	5.4	5.4	5.0	4.8	5.2	4.8	4.9	3.6
	ne	.5	5.9	6.6	5.2	5.6	5.5	5.5	5.7	6.1	5.3	5.4	5.2	5.3	4.8	5.5
		.8	6.2	6.2	5.5	5.5	5.3	5.5	6.0	6.0	5.6	5.5	4.6	4.8	7.7	5.8
		.9	5.5	6.4	4.2	5.2	4.8	5.6	5.2	6.1	4.3	4.9	3.6	5.0	9.8	6.3
B (AB)	0.3	.5	5.3	5.9	5.3	5.9	5.5	5.4	4.1	4.8	28.0	5.6	4.1	4.2	4.3	3.6
		.8	5.7	5.4	5.6	5.0	5.8	5.6	4.7	4.8	23.6	5.0	4.7	4.3	5.1	4.9
		.9	5.3	5.5	5.0	4.9	5.7	6.3	4.5	4.8	17.9	4.9	4.7	5.0	5.6	13.9
	ne	.5	5.6	7.3	5.0	6.2	4.8	5.1	4.5	6.2	24.1	6.0	3.7	3.9	3.6	4.9
		.8	5.6	6.4	4.6	5.1	4.7	5.1	4.3	5.6	17.3	5.1	3.8	4.3	7.2	4.2
		.9	5.6	6.4	4.6	5.1	4.3	5.6	4.8	5.8	10.4	5.1	3.5	4.8	10.0	8.1
AB	0.3	.5	5.7	5.8	5.6	5.8	5.5	5.3	5.6	5.8	5.7	5.7	5.2	5.2	7.0	8.7
		.8	5.4	5.8	5.2	5.5	5.2	5.4	5.3	5.4	5.2	4.6	5.1	5.0	4.8	3.9
		.9	5.5	6.8	5.2	5.0	5.0	5.2	5.0	5.4	5.2	4.4	4.5	4.6	5.9	3.0
	ne	.5	5.2	7.2	4.5	6.1	4.9	5.8	5.1	7.0	4.8	4.9	4.6	5.3	5.7	8.3
		.8	6.1	6.7	5.4	5.5	5.3	5.3	6.1	6.7	5.2	4.4	5.0	4.8	6.4	5.9
		.9	6.0	8.6	4.7	5.1	4.4	4.7	5.8	6.7	4.3	4.0	4.1	5.4	9.7	5.9

effect model	corr	p	parametric		param/HF		multivariate		Puri & Sen		ATS		Koch		GLMM	
			smll	lrg	smll	lrg	smll	lrg	smll	lrg	smll	lrg	smll	lrg	smll	lrg
AB(A)	0.3	.5	5.1	5.4	5.2	5.3	5.3	5.6	5.1	5.2	5.2	5.0	4.9	5.1	7.0	7.2
		.8	5.6	7.1	5.3	6.6	5.9	5.4	5.2	6.5	5.3	4.7	6.4	6.7	1.8	1.7
		.9	5.7	8.1	5.4	7.6	6.0	5.7	5.4	7.7	5.4	4.7	6.5	7.9	2.2	0.9
	ne	.5	5.7	6.8	4.9	5.9	5.1	5.5	5.5	6.7	5.1	5.4	4.8	5.0	5.6	7.9
		.8	6.2	8.4	5.3	6.4	5.9	5.7	5.9	7.5	5.3	5.0	5.9	6.7	2.6	2.3
		.9	5.6	10.8	4.4	7.7	4.4	5.2	5.2	9.2	4.6	4.5	4.7	7.8	5.5	2.7
AB(B)	0.3	.5	5.5	5.3	5.6	5.4	5.4	5.7	2.8	2.2	5.6	5.1	5.1	5.0	7.7	7.1
		.8	6.2	6.1	5.1	5.2	5.3	5.3	3.8	3.4	6.3	4.9	5.1	4.9	2.7	2.4
		.9	7.0	7.7	5.1	6.1	3.8	5.1	4.3	4.0	6.9	5.1	5.8	5.6	3.8	2.7
	ne	.5	5.8	6.4	5.2	5.3	5.0	5.3	3.8	3.7	5.4	5.0	4.8	4.6	6.9	8.4
		.8	6.6	7.8	5.4	5.6	4.7	4.9	5.0	4.9	5.6	4.8	4.4	4.9	6.4	5.3
		.9	6.6	8.2	4.7	6.0	4.0	4.9	5.3	6.3	5.2	4.5	4.1	4.9	6.7	5.2

effect model	corr	p	parametric			param/HF			multivariate			Puri & Sen			ATS			Koch			GLMM		
			$n_i \sim p_i$	n_i	p_i	$n_i \sim p_i$	n_i	p_i	$n_i \sim p_i$	n_i	p_i	$n_i \sim p_i$	n_i	p_i	$n_i \sim p_i$	n_i	p_i	$n_i \sim p_i$	n_i	p_i	$n_i \sim p_i$	n_i	p_i
B(A)	0.3	.5	5.2	5.4		5.2	5.4		5.4	5.5		5.3	5.3		4.9	5.1		4.8	5.3		4.9	5.4	
		.8	5.9	5.3		5.7	5.2		6.0	5.5		5.7	5.5		5.3	4.8		5.7	5.2		3.7	4.1	
		.9	5.5	5.1		5.2	4.8		5.7	5.0		5.3	5.1		4.4	4.6		5.5	4.8		2.7	3.1	
	ne	.5	6.1	5.8		5.1	5.0		5.0	4.8		6.3	5.8		5.3	4.8		5.0	4.6		4.2	4.5	
		.8	6.7	6.2		5.6	5.2		5.4	5.4		6.5	6.2		5.2	4.8		5.0	5.1		4.6	3.8	
		.9	6.4	5.9		5.2	4.9		5.2	5.5		6.2	5.8		4.8	4.2		4.9	5.3		3.0	4.3	
AB(A)	0.3	.5	6.9	3.9		6.9	3.9		6.7	4.0		5.3	4.7		4.7	4.6		6.7	3.7		5.2	4.8	
		.8	16.1	2.3		15.4	2.3		11.6	2.4		15.4	2.2		4.7	3.6		15.3	2.2		3.0	1.1	
		.9	20.7	1.7		19.8	1.6		14.4	1.6		20.3	1.6		4.0	3.5		21.1	1.5		2.2	0.3	
	ne	.5	8.3	5.0		6.7	4.1		6.3	4.2		6.5	6.0		4.6	4.3		6.8	3.5		5.0	4.7	
		.8	17.9	2.9		14.5	2.2		12.0	2.4		16.4	2.8		4.7	3.5		15.9	1.8		4.9	0.9	
		.9	24.4	2.1		19.2	1.6		15.1	1.5		21.9	2.1		4.3	3.3		21.9	3.3		3.0	0.6	

effect model	corr	p	param		param HF		multiv		Puri & Sen		ATS		Koch		GLMM	
			eq	ne	eq	ne	eq	ne	eq	ne	eq	ne	eq	ne	eq	ne
A	0.3	.5	5.7	5.6			5.7	5.4	5.5	5.4	8.5	14.8	5.6	5.4	7.5	6.7
		.8	5.4	5.1			5.4	5.3	5.3	5.0	7.5	10.9	5.2	5.0	5.1	4.9
		.9	4.9	5.2			5.3	5.3	4.8	5.2	5.6	9.5	5.2	5.4	5.5	2.5
	ne	.5	6.4	5.6			5.5	5.3	5.3	5.5	8.6	15.5	5.2	5.2	7.6	8.8
		.8	5.4	5.3			5.4	5.2	5.3	5.0	6.6	10.5	5.2	5.0	2.9	3.0
		.9	5.2	5.2			5.2	5.3	4.8	5.1	5.5	9.5	5.6	5.2	9.6	5.9
A (B)	0.3	.5	5.4	5.4			5.3	5.4	5.3	5.3	8.2	13.0	5.3	5.3	6.6	7.1
		.8	5.1	5.5			5.3	5.3	5.1	5.2	7.0	11.9	5.0	5.3	6.3	5.5
		.9	5.3	5.4			5.3	5.3	5.2	5.3	6.7	11.2	5.6	5.5	3.4	3.6
	ne	.5	5.8	5.5			5.8	5.2	5.5	5.1	8.7	14.5	5.6	5.1	9.3	9.3
		.8	5.3	5.1			5.3	5.3	5.0	4.7	6.7	11.0	5.5	5.2	6.8	6.1
		.9	4.9	5.0			5.0	5.1	5.0	5.0	5.4	8.9	5.0	5.2	3.0	4.0
A(AB)	0.3	.5	5.8	5.2			5.6	5.5	5.2	5.2	8.4	14.2	5.5	5.0	3.9	3.5
		.8	5.5	5.2			5.5	5.1	5.2	5.2	7.1	11.5	5.3	5.0	2.3	7.3
		.9	5.3	5.2			5.3	5.2	5.0	4.8	6.4	9.6	5.4	5.4	4.1	7.3
	ne	.5	5.6	5.6			5.6	5.2	5.2	5.2	8.5	14.9	5.3	5.4	5.9	6.0
		.8	5.4	4.8			5.4	5.2	5.3	5.0	7.1	10.2	6.2	6.6	3.0	6.0
		.9	5.4	4.8			5.2	5.2	5.1	5.2	5.6	8.1	6.4	7.1	3.5	4.0

effect model	corr	p	param		param HF		multiv		Puri & Sen		ATS		Koch		GLMM	
			eq	ne	eq	ne	eq	ne	eq	ne	eq	ne	eq	ne	eq	ne
B	0.3	.5	5.3	5.3	5.4	5.4	5.3	5.2	5.2	5.2	5.6	5.8	4.9	4.9	6.4	6.3
		.8	5.5	5.4	5.4	5.4	5.9	5.9	5.4	5.4	5.4	5.0	5.8	5.8	4.4	4.2
		.9	4.9	5.1	4.6	4.7	5.3	5.6	4.9	4.9	4.6	4.1	4.8	5.1	5.8	2.7
	ne	.5	6.6	6.7	5.7	5.7	5.8	5.8	6.6	6.7	5.7	5.5	5.5	5.5	6.9	6.5
		.8	6.4	6.4	5.5	5.5	5.3	5.3	6.3	6.3	5.5	4.8	5.1	5.1	3.9	5.9
		.9	5.4	5.6	4.3	4.5	4.5	4.6	5.4	5.4	4.3	3.9	4.3	4.4	9.9	7.4
B (A)	0.3	.5	5.7	5.6	5.6	5.6	5.5	5.5	5.5	5.5	5.5	5.2	5.1	5.1	5.6	6.3
		.8	5.5	5.4	5.2	5.2	5.9	5.9	5.3	5.3	5.2	4.9	5.1	5.1	5.2	5.7
		.9	5.5	5.6	4.9	5.1	6.2	5.8	5.4	5.4	4.9	5.0	5.2	5.1	3.6	4.9
	ne	.5	6.4	6.6	5.5	5.6	5.5	4.9	6.1	6.1	5.4	5.0	5.3	4.7	5.5	4.8
		.8	6.2	5.8	5.5	5.1	5.5	5.1	6.0	5.8	5.6	5.1	4.8	4.7	5.6	7.7
		.9	6.4	6.2	4.9	5.2	5.6	5.6	6.1	6.1	4.9	4.5	5.0	5.0	5.8	9.8
B (AB)	0.3	.5	5.9	5.6	5.9	5.6	5.5	5.2	4.8	4.8	5.6	28.0	4.2	4.1	3.6	4.3
		.8	5.4	5.7	5.0	5.6	5.6	5.8	4.5	4.8	5.0	23.6	4.3	4.7	4.9	5.1
		.9	5.5	5.3	4.9	5.0	6.3	5.8	4.8	4.8	4.9	17.9	5.0	4.7	5.3	13.9
	ne	.5	7.3	6.4	6.2	5.6	5.1	4.8	6.2	6.2	6.0	24.1	3.9	3.9	4.9	3.9
		.8	6.4	6.0	5.0	5.1	5.1	5.0	5.6	5.6	5.1	17.3	4.3	4.1	5.2	7.2
		.9	6.4	5.9	5.1	4.6	5.6	4.8	5.7	5.8	5.1	10.4	4.8	4.3	5.1	10.0
AB	0.3	.5	5.8	5.3	5.8	5.3	5.5	5.1	5.8	5.2	5.7	5.4	5.2	5.0	8.7	7.0
		.8	5.6	5.8	5.4	5.5	5.2	5.4	5.2	5.4	5.2	5.1	5.1	5.0	4.8	4.1
		.9	5.5	6.8	5.2	5.0	4.9	5.2	4.8	5.4	5.2	4.3	4.5	4.6	5.9	2.5
	ne	.5	6.5	7.2	5.4	6.1	5.8	5.3	6.0	7.0	4.9	4.8	4.9	5.3	8.3	6.4
		.8	6.3	6.7	5.2	5.5	5.2	5.3	6.1	6.7	5.2	5.1	4.6	5.0	6.4	6.2
		.9	6.0	8.6	4.7	5.1	4.2	4.7	5.8	6.7	4.3	3.9	3.9	5.4	9.7	5.8
AB(A)	0.3	.5	5.4	5.3	5.2	5.3	5.6	5.4	5.2	5.2	5.2	5.2	5.1	4.9	7.2	7.0
		.8	6.2	7.1	6.1	6.6	5.9	4.9	6.0	6.5	5.3	5.0	6.6	6.7	1.8	1.7
		.9	8.1	8.0	7.1	7.5	6.0	5.0	6.9	7.7	5.4	4.5	7.9	7.6	2.2	0.9
	ne	.5	6.8	6.8	5.9	5.7	5.2	5.5	6.7	6.5	5.4	4.9	4.7	5.0	7.9	5.6
		.8	7.5	8.4	6.2	6.4	5.9	4.4	7.2	7.5	5.3	4.8	6.0	6.7	2.6	2.3
		.9	8.4	10.8	6.3	7.7	5.2	5.1	8.2	9.2	4.5	4.6	6.4	7.8	5.5	5.3
AB(B)	0.3	.5	5.5	5.1	5.6	5.2	5.5	5.7	2.7	2.8	5.5	5.6	5.1	5.1	7.7	6.8
		.8	6.2	6.1	5.1	5.2	5.3	5.2	3.8	3.3	5.4	6.3	5.1	4.6	2.7	2.4
		.9	7.5	7.7	5.8	6.1	4.8	5.1	4.3	4.3	5.2	6.9	5.6	5.8	3.8	2.3
	ne	.5	6.4	6.2	5.2	5.3	5.0	5.3	3.7	3.8	5.3	5.4	4.8	4.8	8.4	7.6
		.8	7.4	7.8	5.4	5.6	4.8	4.9	5.0	4.9	5.5	5.6	4.5	4.9	6.4	4.5
		.9	7.8	8.2	5.5	6.0	4.6	4.9	5.9	6.3	4.9	5.2	4.3	4.9	6.7	5.1