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

Appendix B 4
Tables and Graphs of the Power of selected methods in relation to 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.

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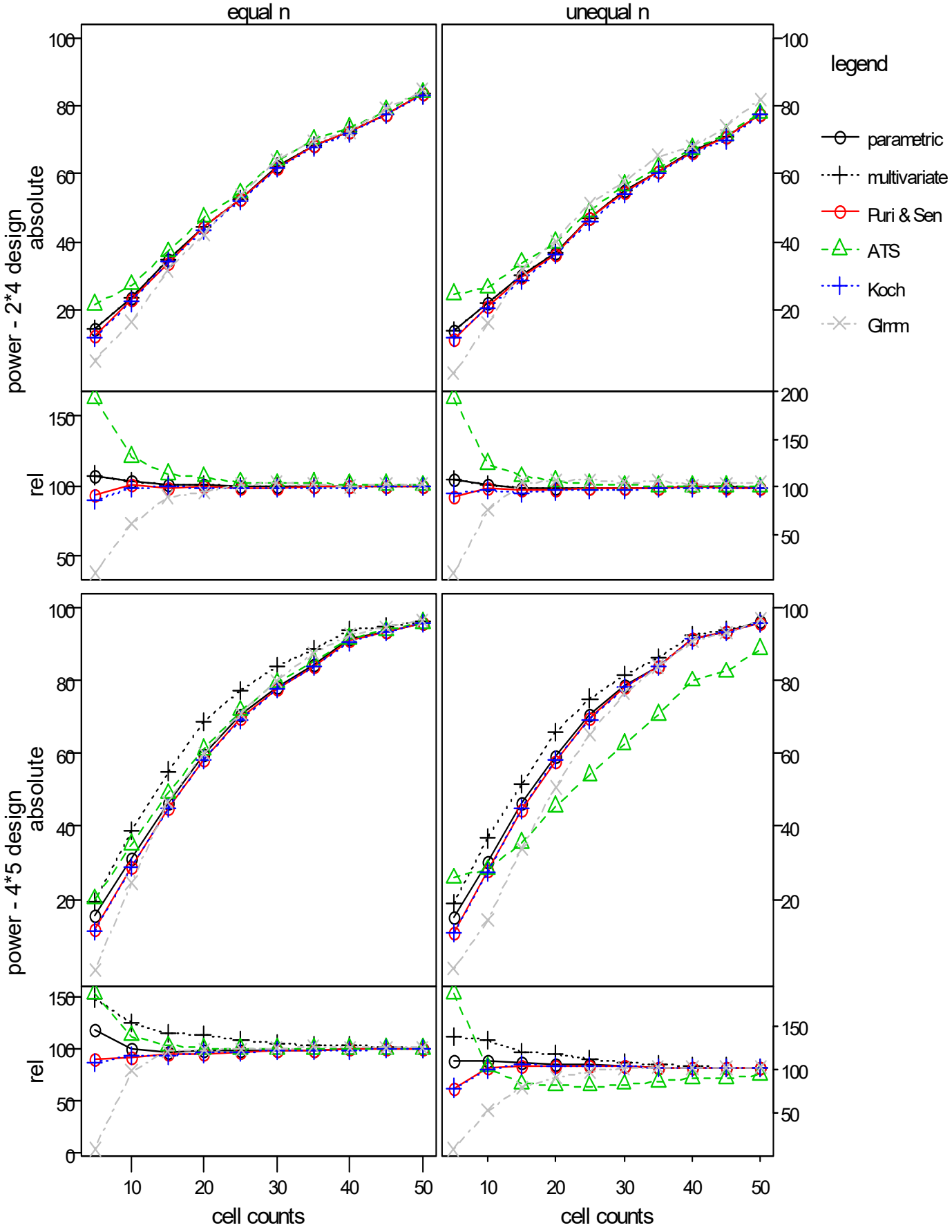
4. 1. Main effect A (effects a_i = 0.4*s)

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

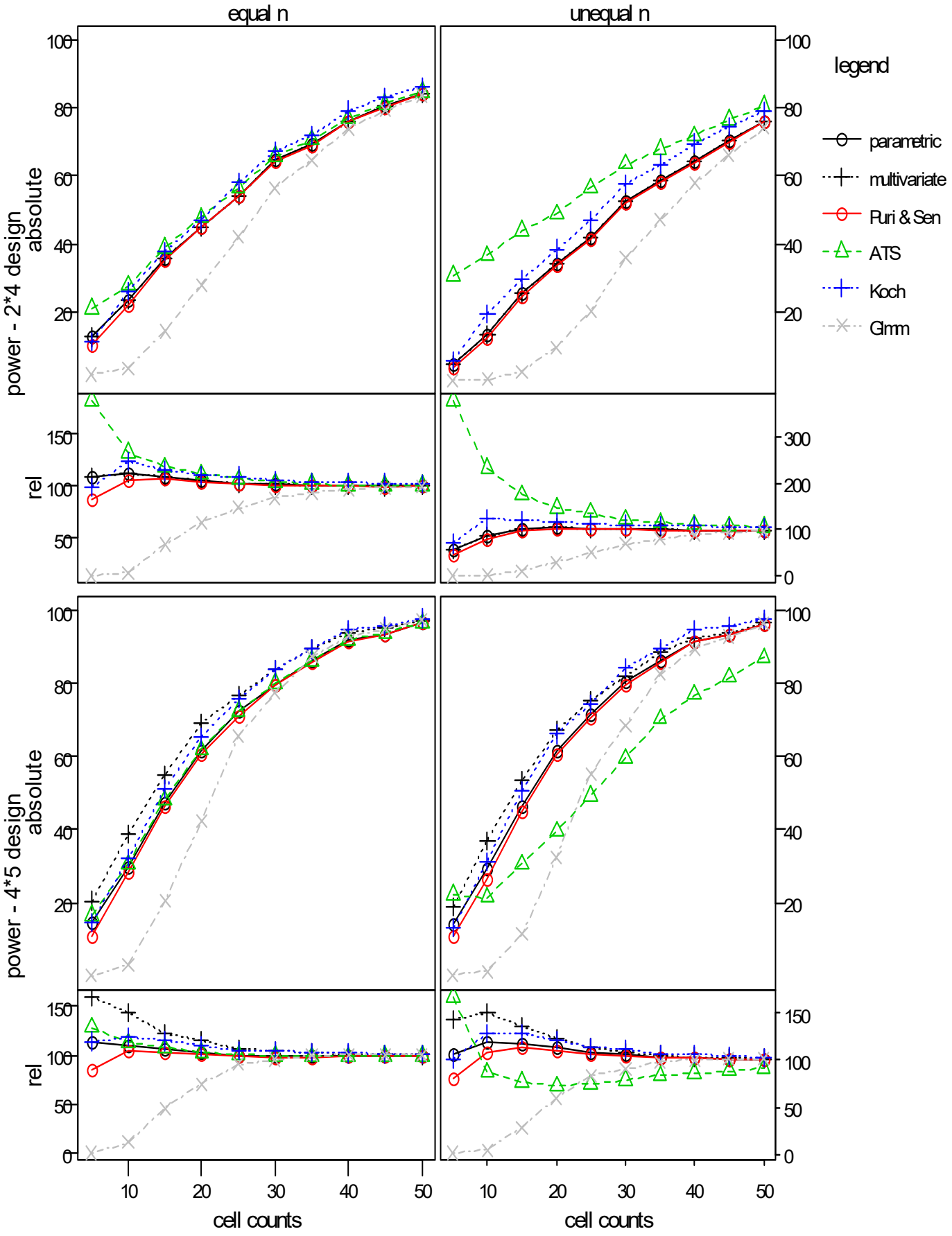
4. 1. 1. 1 p = 0.5

		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	14.25	23.40	34.50	44.40	62.15	72.55	83.25	13.65	21.80	29.85	36.70	55.00	66.55	77.60
	par./ HF-corr.														
	multivariate	14.25	23.40	34.50	44.40	62.15	72.55	83.25	13.65	21.80	29.85	36.70	55.00	66.55	77.60
	Puri & Sen	12.45	22.75	33.90	44.15	61.80	72.30	83.25	11.50	20.90	29.35	36.20	54.60	66.45	77.40
	ATS	21.55	27.25	37.15	47.05	63.85	73.45	83.95	24.60	26.35	33.85	39.85	56.50	67.30	77.85
	Koch	11.95	22.25	33.95	43.35	61.80	71.60	82.95	11.85	20.50	28.40	36.05	54.00	66.30	77.20
	GLMM	5.00	16.40	31.60	42.20	64.00	72.10	84.60	1.20	16.00	31.80	40.10	57.80	67.80	81.90
4*5	parametric	15.40	31.25	46.30	59.45	78.35	91.25	95.55	15.10	30.10	46.30	59.35	78.65	91.45	96.00
	par./ HF-corr.														
	multivariate	19.45	38.90	55.15	68.70	83.85	94.00	96.35	18.90	36.70	51.45	65.85	81.50	92.25	95.95
	Puri & Sen	11.80	28.70	45.10	58.30	77.75	91.00	95.55	10.75	27.95	44.60	58.00	78.05	91.25	95.90
	ATS	20.05	35.05	49.15	61.20	79.50	91.55	95.80	25.80	28.15	35.45	45.40	62.65	80.00	88.65
	Koch	11.40	29.00	44.85	58.40	77.80	90.75	95.70	10.75	27.60	44.75	58.10	78.10	91.25	95.85
	GLMM	0.50	24.60	46.70	60.10	79.90	92.50	96.60	1.00	14.20	33.90	50.70	76.50	90.90	96.80


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
multivariate
Puri & Sen
ATS
Koch
Glmm

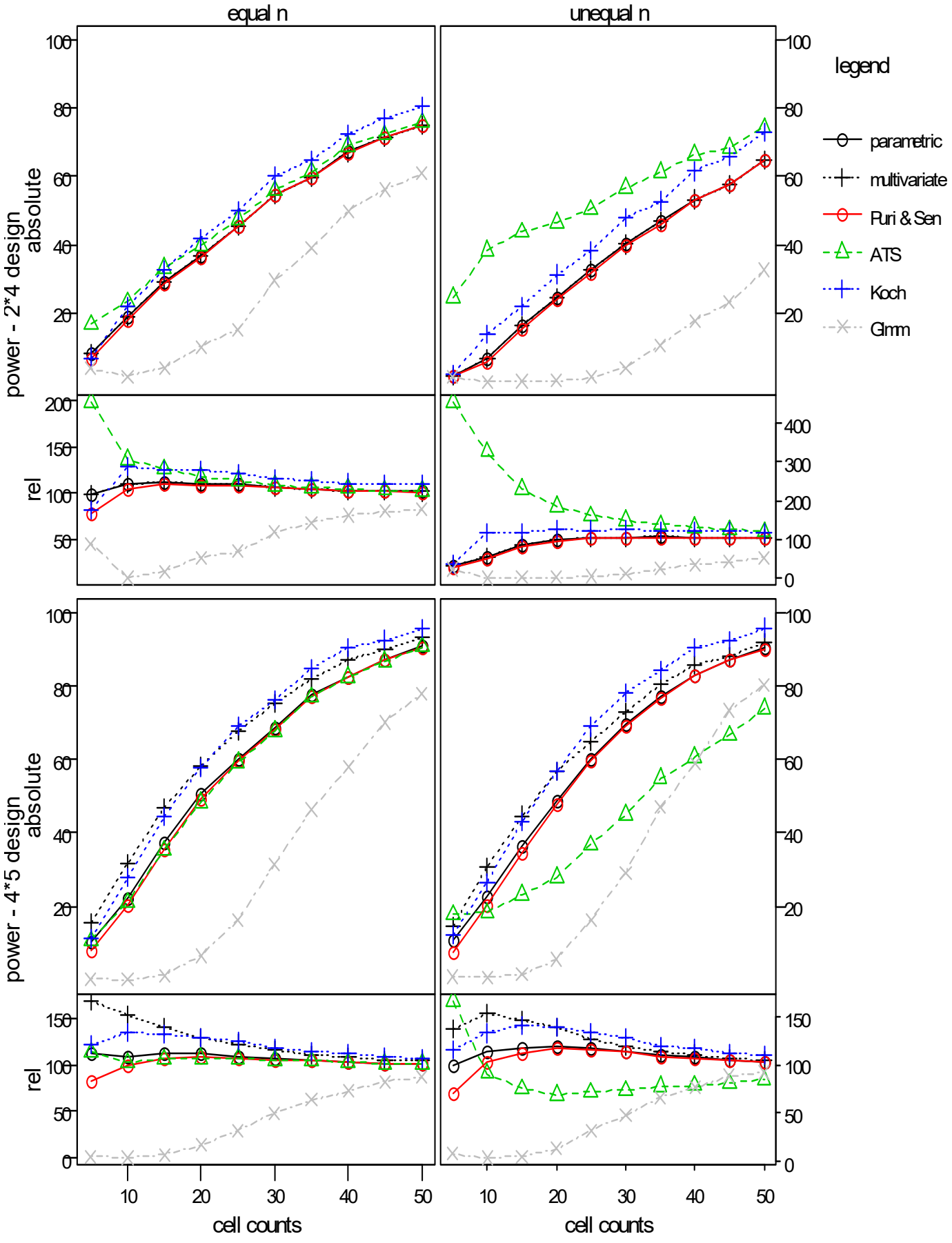
4. 1. 1. 2 p = 0.8

		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	12.55	23.55	35.70	45.00	64.50	76.05	84.15	4.45	13.30	25.30	34.30	52.35	64.05	75.80
	par./ HF-corr.														
	multivariate	12.55	23.55	35.70	45.00	64.50	76.05	84.15	4.45	13.30	25.30	34.30	52.35	64.05	75.80
	Puri & Sen	10.10	22.10	34.95	44.70	64.15	76.00	84.05	3.50	12.25	24.55	33.80	51.95	63.65	75.75
	ATS	20.90	27.80	38.80	47.70	65.80	76.80	84.60	30.60	36.65	43.80	48.70	63.40	71.55	80.40
	Koch	11.30	25.95	37.60	47.05	67.20	79.15	86.15	5.60	19.25	29.65	38.45	57.55	69.50	79.00
	GLMM	1.60	3.51	14.33	27.96	56.41	73.75	83.47	0.00	0.20	2.50	9.50	35.90	57.70	73.90
4*5	parametric	14.50	30.00	47.50	61.65	79.85	91.80	96.55	14.15	29.25	46.40	61.80	80.45	91.70	96.20
	par./ HF-corr.														
	multivariate	20.50	38.95	54.75	68.95	84.00	94.00	97.15	18.85	36.80	53.60	67.35	81.80	92.60	96.60
	Puri & Sen	10.90	28.15	46.20	60.45	79.40	91.70	96.50	10.75	26.65	45.05	60.50	79.85	91.40	96.05
	ATS	16.45	30.55	48.10	61.85	80.05	91.95	96.65	22.15	21.45	30.50	39.70	59.60	77.00	87.15
	Koch	14.65	32.15	51.05	65.50	84.05	94.70	97.85	13.30	31.30	50.45	66.10	84.35	94.70	97.60
	GLMM	0.00	3.00	20.40	42.30	77.40	93.10	97.50	0.20	1.10	11.32	32.57	68.64	89.48	96.39


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 1. 1. 3 p = 0.9

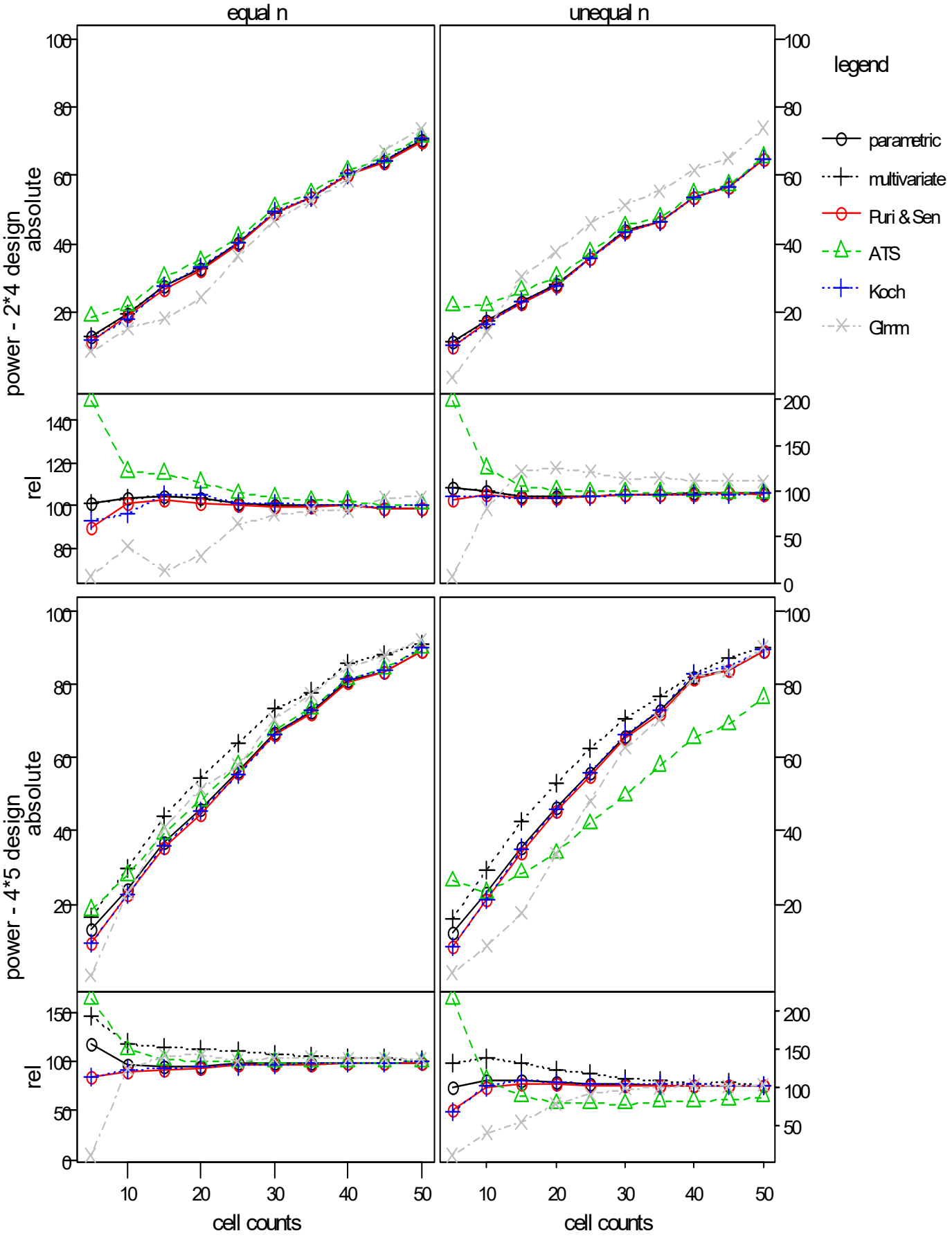
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	8.25	18.85	29.25	36.85	54.60	67.00	74.75	1.65	6.50	16.45	24.45	40.05	53.20	64.80
	par./ HF-corr.														
	multivariate	8.25	18.85	29.25	36.85	54.60	67.00	74.75	1.65	6.50	16.45	24.45	40.05	53.20	64.80
	Puri & Sen	6.50	17.85	28.75	36.20	54.40	66.85	74.65	1.40	5.65	15.30	24.05	39.80	53.05	64.65
	ATS	16.75	23.35	33.10	39.65	55.90	68.80	75.70	24.50	38.35	43.75	46.45	56.65	66.25	74.20
	Koch	6.95	22.00	32.65	41.90	59.85	72.45	80.40	1.95	13.70	22.00	31.35	48.10	61.40	72.80
	GLMM	3.82	1.41	4.02	10.06	29.58	49.70	60.66	1.20	0.00	0.10	0.30	4.00	17.80	32.60
4*5	parametric	10.40	22.30	37.45	50.50	68.80	82.60	90.80	10.70	22.80	36.20	48.85	69.60	83.15	90.30
	par./ HF-corr.														
	multivariate	15.70	31.45	46.80	58.35	75.25	87.35	93.35	14.60	30.85	44.70	56.70	73.15	85.90	92.00
	Puri & Sen	7.75	20.50	35.35	49.20	68.05	82.40	90.65	7.60	20.50	34.45	47.80	68.95	82.80	90.10
	ATS	10.60	21.05	35.30	48.25	67.80	82.60	90.70	17.80	18.20	23.15	27.95	45.00	60.75	74.00
	Koch	11.35	27.70	44.30	57.85	76.40	90.60	95.85	12.35	26.60	43.15	56.65	78.15	90.60	95.95
	GLMM	0.20	0.10	1.20	6.50	31.50	58.00	78.10	0.80	0.70	1.41	5.53	29.18	58.95	80.48


equal n
unequal n
power - 2*4 design absolute
power - 4*5 design absolute
rel
cell counts
legend
parametric
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 1. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

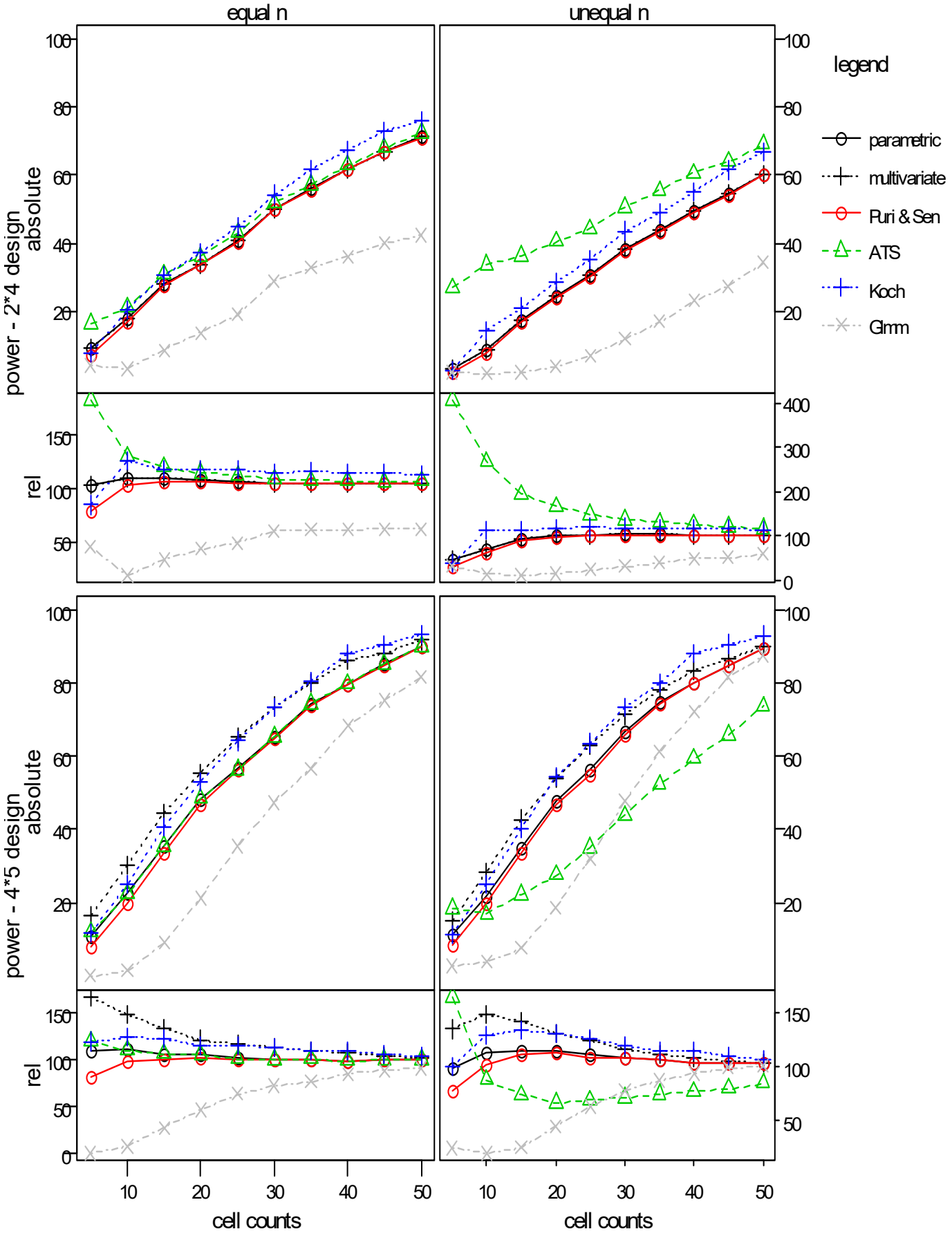
4. 1. 2. 1 p = 0.5

		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	12.55	19.35	27.30	32.80	49.15	60.20	70.05	11.35	17.55	23.15	28.10	43.75	53.55	64.75
	par./ HF-corr.														
	multivariate	12.55	19.35	27.30	32.80	49.15	60.20	70.05	11.35	17.55	23.15	28.10	43.75	53.55	64.75
	Puri & Sen	11.15	18.90	26.75	32.10	48.75	60.00	69.85	10.00	16.75	22.65	27.70	43.40	53.45	64.50
	ATS	18.55	21.65	30.05	35.10	50.65	61.30	71.20	21.70	21.75	26.25	30.30	45.10	54.55	65.15
	Koch	11.55	17.95	27.40	33.20	49.40	60.40	70.75	10.30	16.55	22.80	27.75	43.50	53.40	64.70
	GLMM	8.30	15.10	18.10	24.20	46.70	58.60	73.70	0.80	14.10	30.30	37.50	51.30	61.40	73.80
4*5	parametric	13.30	24.30	36.80	45.90	66.80	81.00	89.30	12.25	23.25	35.35	46.40	66.05	81.80	89.25
	par./ HF-corr.														
	multivariate	16.50	29.65	43.95	54.50	73.25	85.65	90.85	16.00	29.15	42.75	53.10	70.50	83.05	90.05
	Puri & Sen	9.45	22.50	35.50	44.70	66.15	80.60	89.10	8.50	21.20	33.90	45.40	65.40	81.30	89.20
	ATS	18.50	28.00	39.05	48.40	67.55	81.40	89.80	26.30	23.20	28.55	33.85	49.60	65.35	76.35
	Koch	9.50	22.80	35.80	45.50	66.50	81.35	90.00	8.35	21.40	35.20	46.05	66.55	82.80	89.65
	GLMM	0.50	23.12	40.84	51.55	70.47	84.88	92.29	1.30	8.60	17.50	33.80	62.70	81.90	90.20


equal n
unequal n
power - 2*4 design absolute
rel
power - 4*5 design absolute
rel
cell counts
cell counts
legend
parametric
multivariate
Puri & Sen
ATS
Koch
Glmm

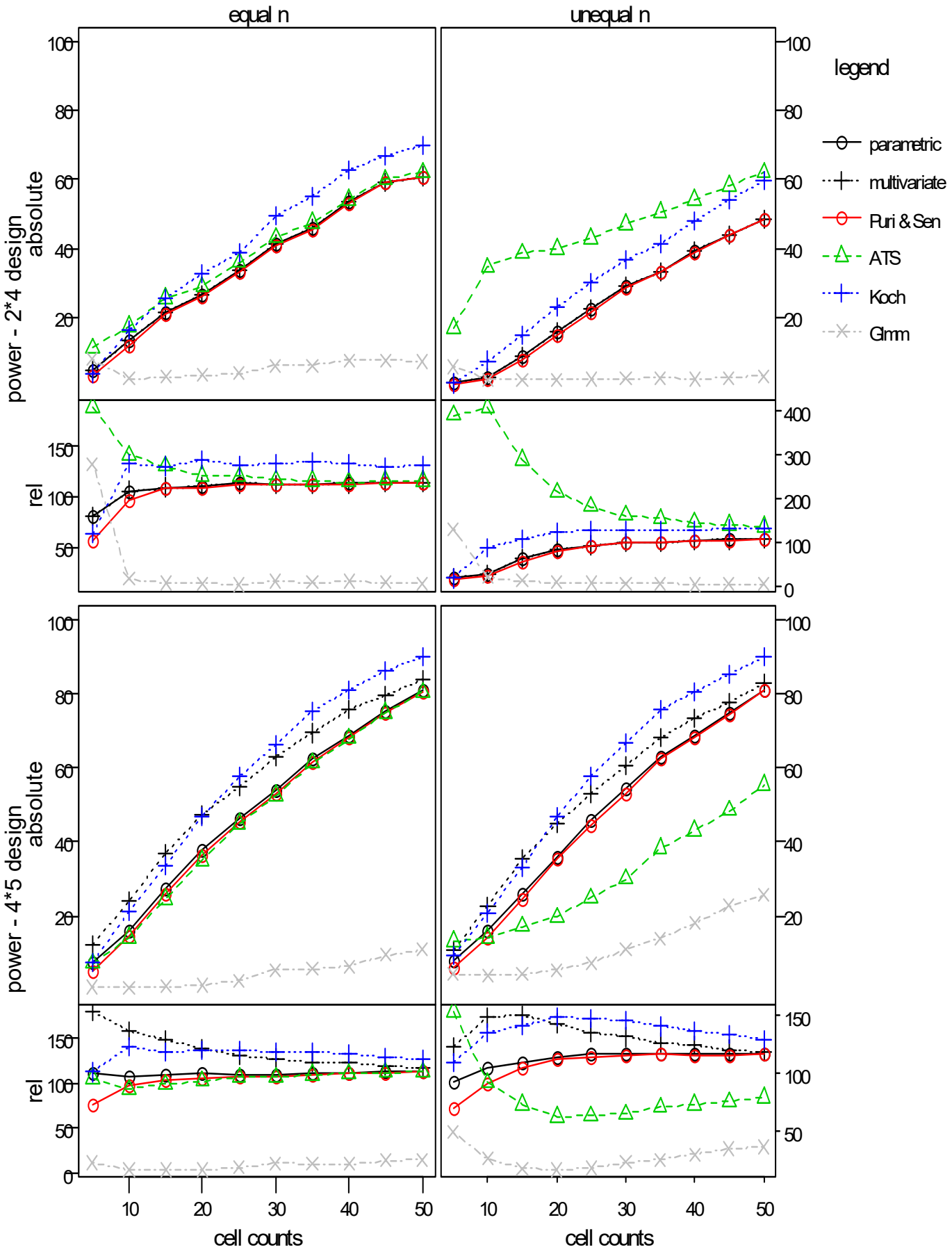
4. 1. 2. 2 p = 0.8

		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	9.30	17.80	28.15	33.70	50.10	61.55	71.15	2.95	8.95	17.55	24.60	38.05	49.25	60.20
	par./ HF-corr.														
	multivariate	9.30	17.80	28.15	33.70	50.10	61.55	71.15	2.95	8.95	17.55	24.60	38.05	49.25	60.20
	Puri & Sen	7.20	16.75	27.30	33.45	49.75	61.40	71.00	2.05	7.90	16.75	24.05	37.90	49.00	60.00
	ATS	16.50	21.15	30.80	36.00	51.85	62.85	72.40	26.85	33.80	36.20	40.50	50.50	60.50	68.95
	Koch	7.65	20.55	30.35	37.05	54.25	67.10	76.00	2.60	14.20	21.15	28.60	43.55	55.15	66.65
	GLMM	4.12	3.11	8.63	13.65	28.92	36.04	42.27	2.13	1.72	2.13	3.75	11.97	23.12	34.28
4*5	parametric	10.90	22.45	35.45	48.40	65.50	79.85	90.05	11.10	21.60	34.80	47.80	66.90	80.25	89.50
	par./ HF-corr.														
	multivariate	16.65	30.10	44.60	55.50	73.65	86.20	91.75	15.10	28.55	42.80	54.10	71.35	83.30	90.10
	Puri & Sen	8.10	19.80	33.60	46.90	64.85	79.60	90.00	8.65	19.65	33.50	46.80	66.05	79.95	89.40
	ATS	11.95	22.40	35.45	48.45	65.50	80.00	90.05	18.45	16.85	22.30	27.60	43.85	59.35	73.80
	Koch	11.90	25.10	40.55	52.90	73.45	88.10	93.45	11.25	24.85	40.35	54.35	73.60	88.15	93.10
	GLMM	0.00	1.50	9.10	21.20	47.30	68.40	81.60	2.77	3.80	7.70	18.79	47.84	72.18	87.68


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 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	4.75	13.10	21.40	26.50	41.25	53.35	60.85	0.95	2.45	8.65	15.60	29.15	39.20	48.35
	par./ HF-corr.														
	multivariate	4.75	13.10	21.40	26.50	41.25	53.35	60.85	0.95	2.45	8.65	15.60	29.15	39.20	48.35
	Puri & Sen	3.30	11.95	21.10	25.80	41.00	53.10	60.60	0.70	2.00	7.55	15.00	28.65	38.90	48.25
	ATS	11.15	17.50	25.50	28.90	43.10	54.15	61.95	16.95	34.55	38.60	39.80	47.00	53.95	62.05
	Koch	3.75	16.50	25.50	32.70	49.25	62.50	69.80	0.85	7.45	14.70	23.00	36.90	48.10	59.75
	GLMM	7.85	2.31	2.82	3.32	5.94	7.65	7.24	5.71	1.94	1.94	2.04	2.34	2.14	2.96
4*5	parametric	7.60	16.25	27.35	37.95	54.15	68.65	80.90	7.95	15.95	25.90	36.05	54.30	68.65	80.95
	par./ HF-corr.														
	multivariate	12.25	24.00	36.80	47.45	62.90	75.90	84.00	10.60	22.60	35.30	45.20	60.65	73.30	82.85
	Puri & Sen	5.25	14.80	25.90	36.40	53.25	68.10	80.65	6.00	13.90	24.65	35.50	53.20	68.20	80.90
	ATS	7.20	14.15	24.65	35.05	52.70	67.90	80.40	13.20	14.10	17.20	19.70	29.95	43.10	55.40
	Koch	7.65	21.35	33.55	46.80	66.35	81.15	90.15	9.40	20.70	33.20	46.70	66.95	80.55	90.15
	GLMM	0.80	0.60	1.01	1.31	5.53	6.33	10.85	4.26	4.05	4.37	5.41	10.91	17.98	25.68

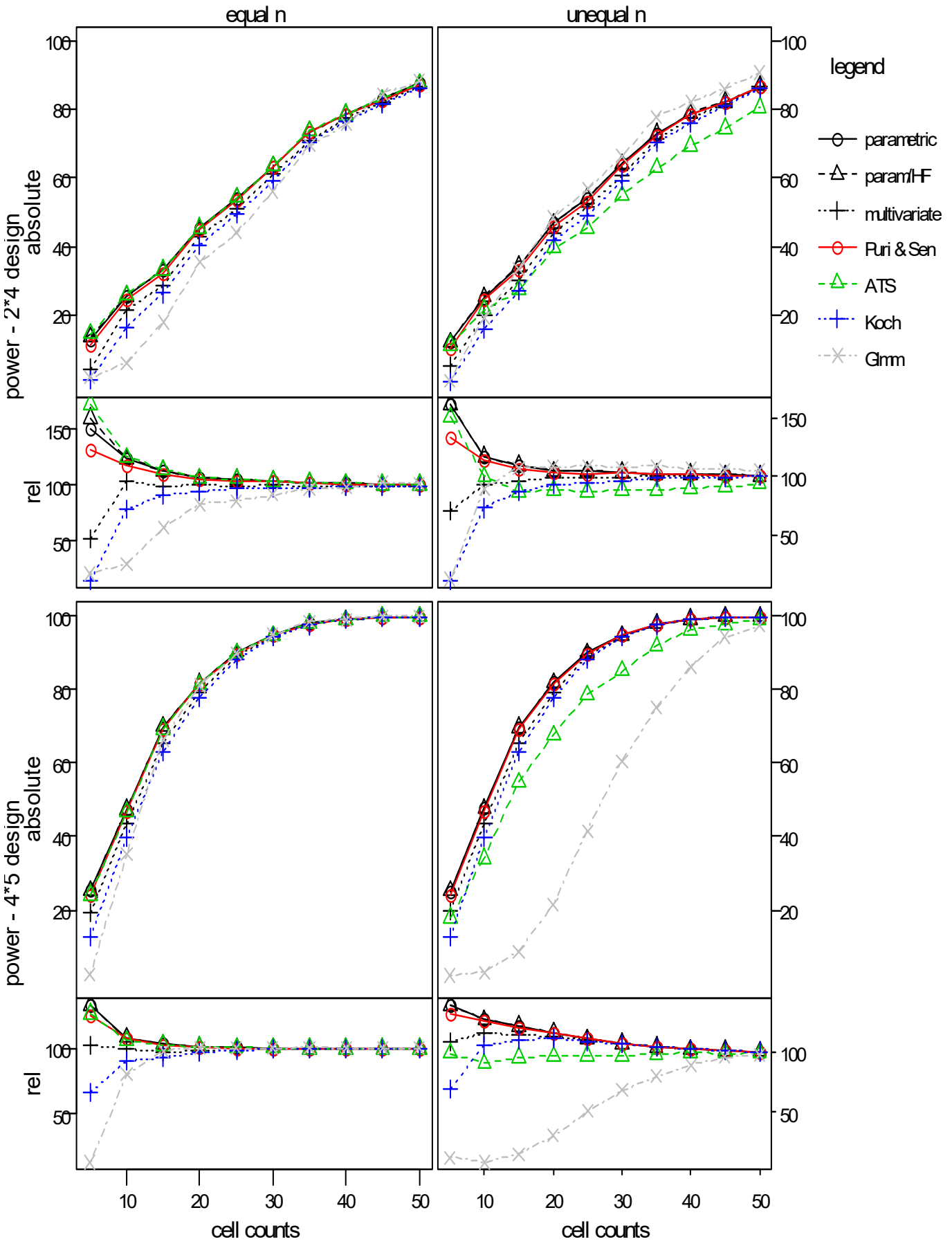

equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 2. Main effect B (effects b_i = 0.3*s)

4. 2. 1. equal correlations on B (r=0.3)

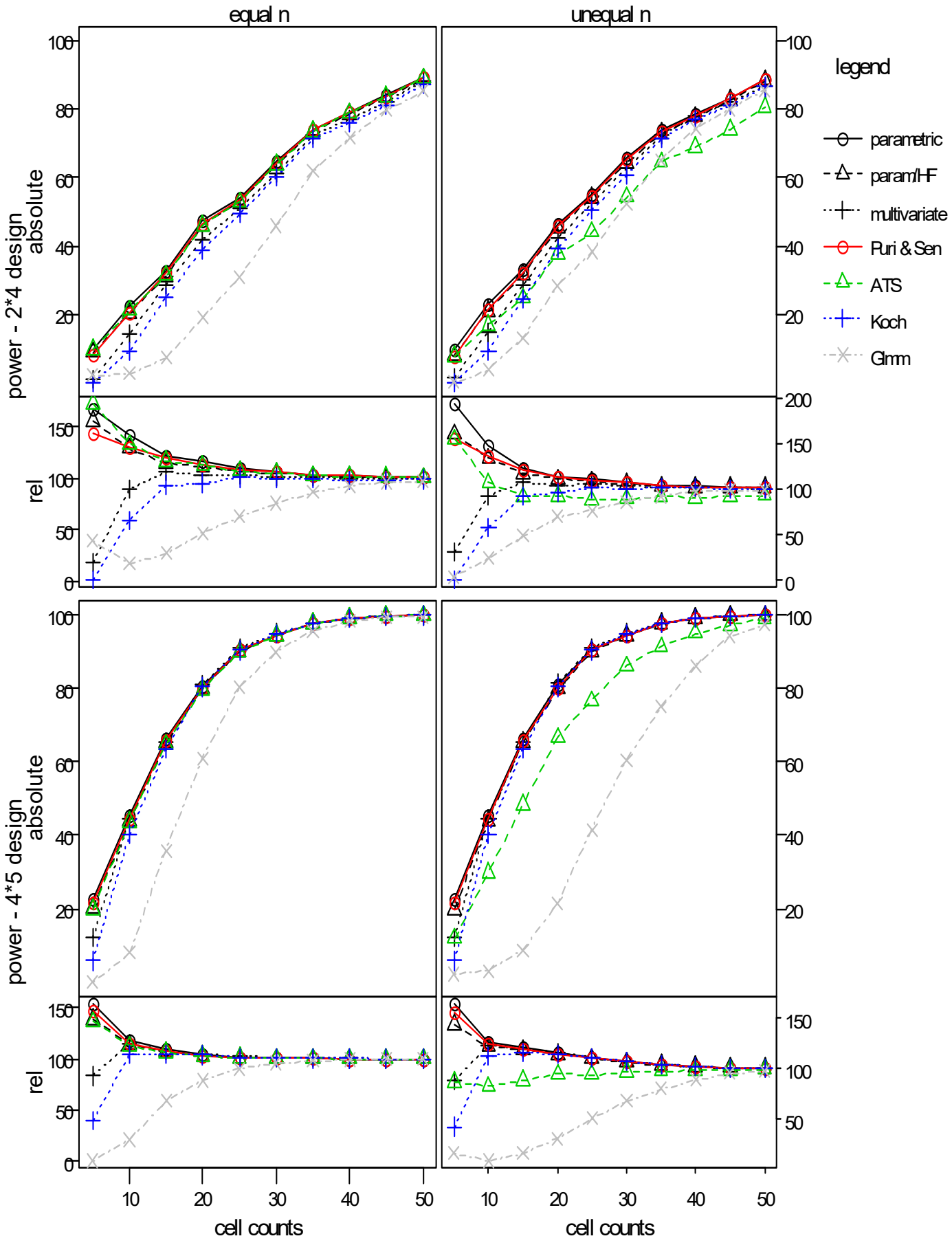
4. 2. 1. 1 p = 0.5

		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	12.75	25.60	32.95	45.55	63.15	78.55	87.40	12.20	25.20	34.20	47.10	64.30	78.60	86.80
	par./ HF-corr.	13.50	25.60	32.95	45.25	63.35	78.55	87.40	12.20	25.30	34.30	46.70	64.00	78.70	86.75
	multivariate	4.40	21.55	28.70	42.95	61.10	77.15	86.30	5.30	20.15	29.85	44.00	60.80	77.35	86.65
	Puri & Sen	11.10	24.45	32.15	44.85	62.95	78.25	87.05	10.10	24.50	33.30	46.10	63.85	78.30	86.70
	ATS	14.55	25.90	33.20	45.35	63.35	78.55	87.40	11.40	21.60	27.20	39.45	54.80	69.30	80.60
	Koch	1.20	16.15	26.30	40.30	59.25	76.45	85.85	0.80	15.75	27.10	41.65	59.30	76.10	86.20
	GLMM	1.72	6.05	17.86	35.42	56.00	75.48	88.19	0.90	19.30	33.60	48.40	66.20	82.00	90.60
4*5	parametric	25.35	47.40	69.75	81.60	94.75	99.05	99.75	25.25	47.60	69.60	81.80	94.75	99.05	99.75
	par./ HF-corr.	25.35	47.40	69.85	81.60	94.75	99.00	99.75	25.25	47.55	69.70	81.85	94.75	99.05	99.70
	multivariate	19.50	43.55	65.25	79.25	94.55	98.95	99.70	19.65	43.60	65.55	79.15	94.50	98.90	99.70
	Puri & Sen	23.85	47.05	69.00	81.60	94.75	99.05	99.75	23.85	47.05	69.00	81.60	94.75	99.05	99.75
	ATS	24.05	46.55	69.20	81.45	94.75	99.00	99.75	17.95	34.05	54.80	67.60	85.05	96.25	98.90
	Koch	12.60	39.70	63.20	77.95	94.15	98.90	99.70	12.60	39.70	63.20	77.95	94.15	98.90	99.70
	GLMM	2.50	35.20	66.30	81.00	94.80	98.90	99.90	2.24	3.06	8.67	21.63	60.41	86.12	97.24


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

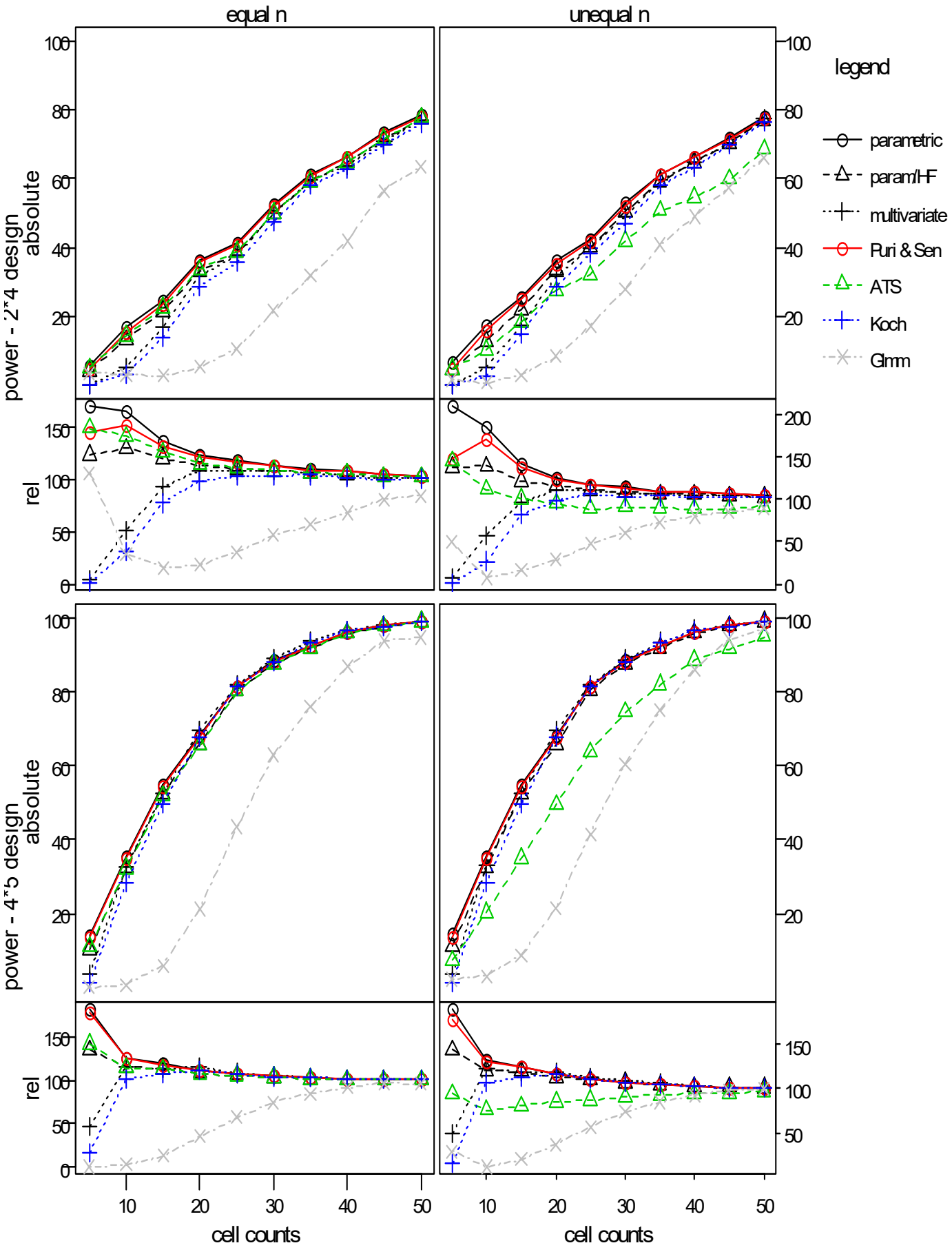
4. 2. 1. 2 p = 0.8

		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	9.60	22.45	32.45	47.35	64.60	79.05	89.15	9.75	23.10	33.20	46.45	65.60	78.25	88.55
	par./ HF-corr.	8.90	20.50	30.90	45.70	63.45	78.65	88.75	8.10	20.95	31.60	45.10	64.30	77.55	88.25
	multivariate	1.05	14.25	28.45	41.90	61.25	77.00	87.85	1.55	14.60	28.75	42.35	62.50	77.90	86.75
	Puri & Sen	8.25	20.55	31.95	46.50	64.25	78.90	89.10	7.85	21.40	32.35	45.85	65.20	77.95	88.40
	ATS	9.85	21.15	31.35	45.90	63.65	78.70	88.85	7.80	16.85	24.70	37.75	54.25	68.80	80.40
	Koch	0.10	9.35	25.10	38.90	59.95	75.95	87.20	0.05	9.15	24.70	39.30	60.70	76.80	86.30
	GLMM	2.23	2.74	7.31	19.09	45.89	71.37	85.28	0.20	3.80	13.20	28.40	52.40	74.10	85.40
4*5	parametric	22.55	45.65	66.35	80.65	94.55	99.05	99.85	22.75	45.65	66.50	80.85	94.55	99.05	99.85
	par./ HF-corr.	20.25	44.00	65.10	79.90	94.35	99.05	99.85	19.90	43.85	65.25	79.85	94.35	99.05	99.85
	multivariate	12.15	44.30	65.50	81.20	95.00	99.10	99.80	12.25	44.30	65.60	81.30	95.00	99.10	99.80
	Puri & Sen	21.55	44.60	65.75	80.20	94.50	99.05	99.85	21.55	44.60	65.75	80.20	94.50	99.05	99.85
	ATS	19.95	43.50	64.85	79.65	94.30	99.05	99.85	11.95	29.75	48.40	66.60	86.15	94.95	98.85
	Koch	5.85	40.30	63.30	80.35	94.80	99.10	99.80	5.85	40.30	63.30	80.35	94.80	99.10	99.80
	GLMM	0.00	8.00	35.80	61.00	90.00	98.30	99.40	2.24	3.06	8.67	21.63	60.41	86.12	97.24


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 2. 1. 3 p = 0.9

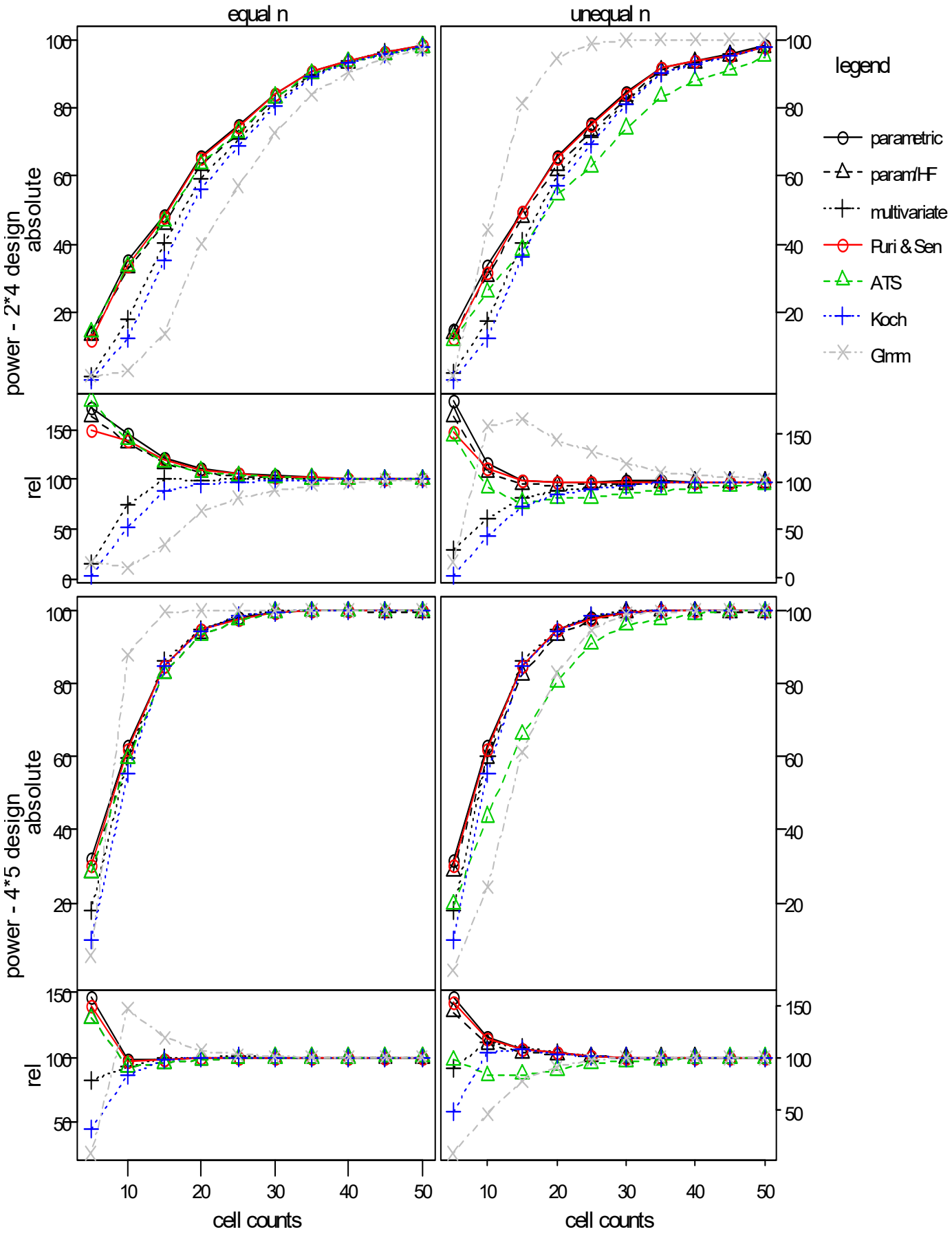
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	5.70	16.80	24.30	36.10	52.30	66.25	78.20	6.85	17.20	25.65	36.40	52.80	66.25	77.70
	par./ HF-corr.	4.15	13.15	21.45	33.25	49.85	64.60	77.50	4.50	12.90	21.90	33.50	50.20	64.80	76.75
	multivariate	0.15	5.25	16.65	31.50	49.70	63.60	76.80	0.25	5.30	17.45	31.80	49.00	64.45	77.15
	Puri & Sen	4.85	15.40	23.45	35.60	52.00	66.05	78.00	4.80	15.80	24.95	35.35	52.20	66.05	77.35
	ATS	5.00	14.40	22.50	33.40	49.95	64.75	77.60	4.75	10.35	18.25	27.45	41.90	54.55	68.40
	Koch	0.05	3.25	13.85	28.80	47.40	62.45	76.05	0.05	2.50	14.90	28.50	47.00	63.15	76.50
	GLMM	3.56	2.95	2.85	5.39	21.65	41.77	63.41	1.60	0.70	3.01	8.32	27.86	48.90	66.13
4*5	parametric	14.15	35.50	54.90	68.10	88.50	96.15	99.20	14.70	35.70	54.80	68.15	88.50	96.15	99.20
	par./ HF-corr.	10.45	32.35	52.35	65.85	87.65	95.90	99.20	11.10	32.30	52.45	65.95	87.70	95.90	99.15
	multivariate	3.65	32.75	52.40	69.65	88.90	96.80	99.20	3.85	32.90	52.45	69.45	88.85	96.90	99.20
	Puri & Sen	13.75	35.05	54.40	67.70	88.30	96.05	99.20	13.75	35.05	54.40	67.70	88.30	96.05	99.20
	ATS	11.00	32.15	51.80	65.60	87.65	95.90	99.20	7.25	20.25	35.10	49.60	74.55	88.60	95.00
	Koch	1.25	28.40	49.65	67.95	88.25	96.75	99.15	1.25	28.40	49.65	67.95	88.25	96.75	99.15
	GLMM	0.00	0.70	6.00	21.20	63.00	86.80	94.80	2.24	3.06	8.67	21.63	60.41	86.12	97.24


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

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

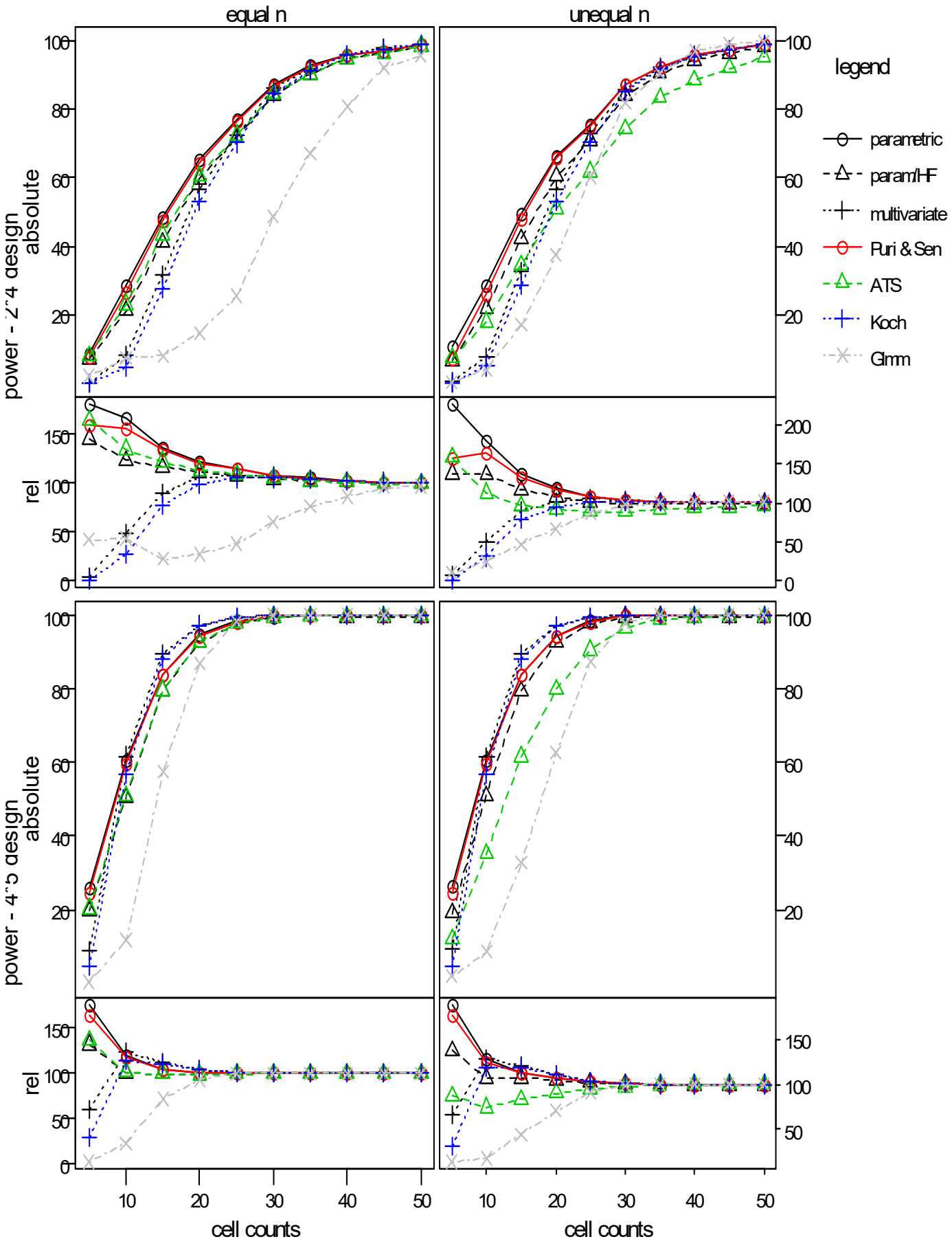
4. 2. 2. 1 p = 0.5

		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	13.65	35.00	48.30	65.65	84.05	93.70	98.20	14.85	33.40	49.65	65.45	84.35	93.80	98.00
	par./ HF-corr.	13.05	32.85	45.95	63.30	82.90	93.30	97.80	13.55	30.55	47.70	63.25	82.40	93.15	97.50
	multivariate	1.25	17.90	40.25	58.85	81.60	93.65	97.95	2.30	17.25	40.50	60.00	82.05	93.25	97.95
	Puri & Sen	11.90	33.60	47.70	65.00	83.80	93.60	98.05	12.30	31.65	49.35	65.05	84.15	93.70	97.90
	ATS	14.25	33.55	46.55	63.60	83.10	93.35	97.80	11.85	25.95	38.35	54.40	73.85	87.90	94.90
	Koch	0.25	12.35	35.35	56.00	80.55	93.20	97.90	0.15	12.10	36.40	57.30	80.80	92.75	97.70
	GLMM	1.30	2.70	13.70	40.00	72.50	90.10	97.00	1.30	43.90	81.40	94.60	99.80	99.90	100.00
4*5	parametric	31.95	63.20	85.05	94.75	99.60	99.95	99.95	31.55	63.10	85.00	94.70	99.65	99.95	99.95
	par./ HF-corr.	28.45	59.70	82.75	93.55	99.55	99.95	99.95	28.65	59.55	82.60	93.45	99.55	99.95	99.95
	multivariate	17.80	59.90	86.25	94.75	99.80	99.95	99.95	17.85	60.10	86.10	94.65	99.80	99.95	99.95
	Puri & Sen	30.45	62.15	84.65	94.70	99.60	99.95	99.95	30.45	62.15	84.65	94.70	99.60	99.95	99.95
	ATS	28.35	59.40	82.85	93.40	99.55	99.95	99.95	19.50	43.50	66.00	80.60	96.15	99.05	99.90
	Koch	9.70	55.60	84.65	94.30	99.75	99.95	99.95	9.70	55.60	84.65	94.30	99.75	99.95	99.95
	GLMM	5.60	88.10	99.60	100.0	100.0	100.0	100.0	1.70	24.30	61.20	82.90	99.10	100.0	100.00


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

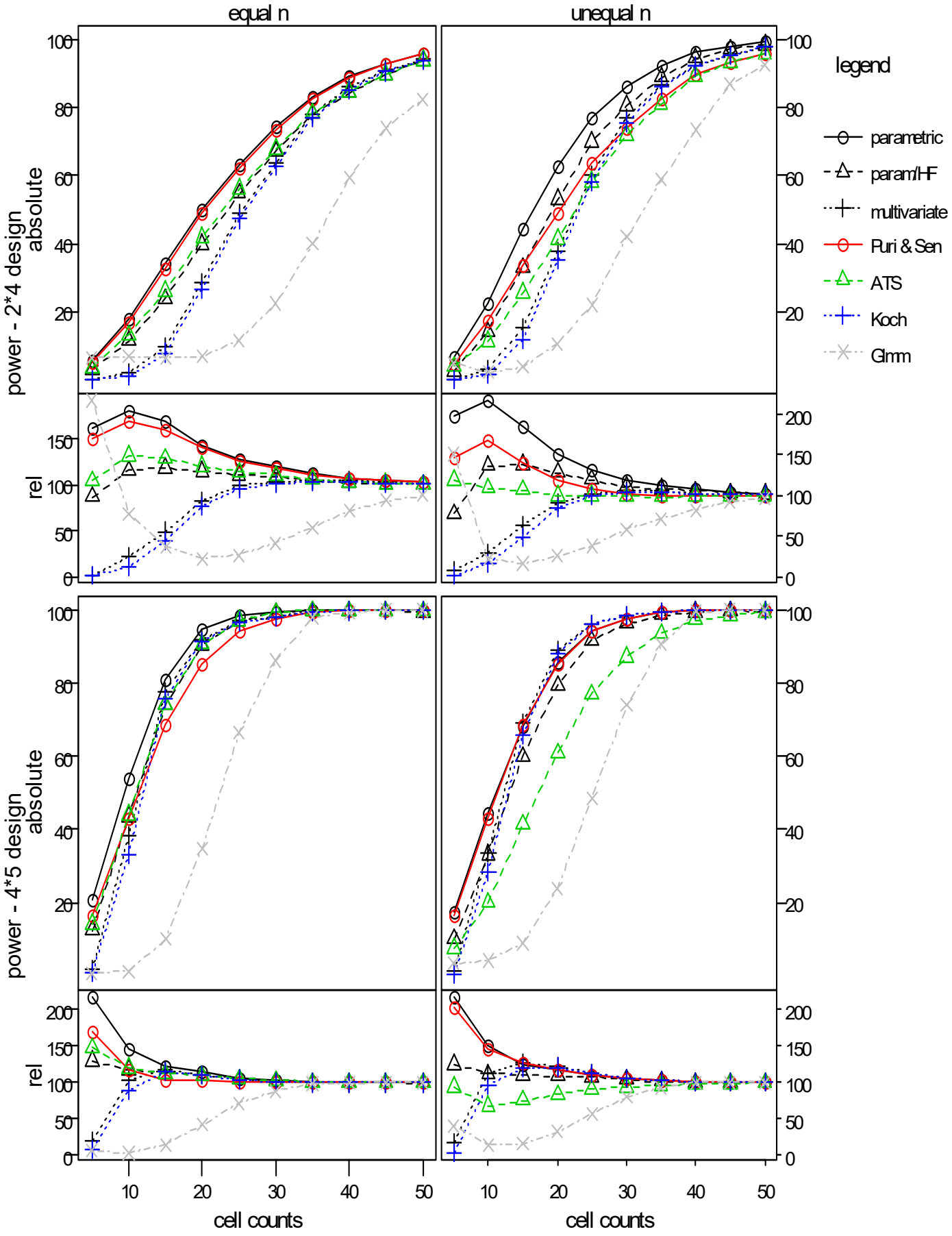
4. 2. 2. 2 p = 0.8

		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	8.95	28.45	48.25	65.05	86.95	95.65	98.55	10.65	28.70	49.20	66.45	86.90	95.80	98.85
	par./ HF-corr.	7.20	21.10	41.20	59.60	84.00	94.55	98.30	6.45	21.80	42.05	60.30	83.75	94.20	98.10
	multivariate	0.25	8.40	31.70	56.50	85.80	95.80	98.75	0.35	7.85	32.70	56.60	85.75	95.45	98.95
	Puri & Sen	7.90	26.60	47.50	64.00	86.80	95.55	98.55	7.45	26.25	47.95	65.80	86.85	95.70	98.90
	ATS	8.15	23.05	43.35	60.40	84.40	94.70	98.30	7.45	17.95	34.60	51.05	74.15	88.25	95.15
	Koch	0.05	4.65	27.60	53.10	84.35	95.65	98.70	0.05	4.95	28.50	52.90	85.00	95.35	98.70
	GLMM	2.11	7.44	8.15	14.69	48.59	80.58	95.27	0.50	4.01	16.93	37.37	81.76	96.69	99.60
4*5	parametric	26.20	60.60	83.95	94.65	99.75	99.95	99.95	26.30	60.75	83.80	94.55	99.80	99.95	99.95
	par./ HF-corr.	19.65	50.55	79.70	92.60	99.60	99.95	99.95	19.10	51.05	79.55	92.65	99.55	99.95	99.95
	multivariate	9.00	61.80	89.55	97.40	99.85	99.95	99.95	9.20	61.45	89.40	97.30	99.85	99.95	99.95
	Puri & Sen	24.50	59.60	83.70	94.55	99.80	99.95	99.95	24.50	59.60	83.70	94.55	99.80	99.95	99.95
	ATS	20.30	51.00	79.65	92.70	99.60	99.95	99.95	12.10	35.20	61.60	79.90	96.70	99.65	99.95
	Koch	4.45	56.90	88.15	97.20	99.85	99.95	99.95	4.45	56.90	88.15	97.20	99.85	99.95	99.95
	GLMM	0.40	11.75	57.53	86.95	100.0	100.0	100.0	1.93	8.54	32.83	62.70	97.97	100.0	100.00


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 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	5.45	18.00	34.05	49.95	74.15	89.00	95.70	6.65	22.60	44.50	62.75	85.95	96.35	99.10
	par./ HF-corr.	2.95	11.50	23.85	39.80	67.00	84.25	93.65	2.60	14.25	33.00	53.10	80.60	94.35	98.35
	multivariate	0.05	2.15	9.95	28.75	63.85	86.05	94.15	0.25	3.00	15.25	37.70	77.00	92.05	97.85
	Puri & Sen	5.10	16.75	32.40	49.05	73.35	88.55	95.55	4.90	17.60	33.55	48.75	73.80	89.55	95.80
	ATS	3.55	13.10	26.05	41.75	67.80	84.65	93.70	4.00	11.35	25.60	41.25	71.80	89.20	95.70
	Koch	0.05	1.05	7.95	26.55	62.45	85.00	93.85	0.05	1.75	11.60	35.30	75.60	91.90	97.85
	GLMM	6.49	6.80	6.59	6.90	22.41	59.33	82.25	5.07	2.33	3.85	10.65	41.99	73.33	92.49
4*5	parametric	20.85	54.00	81.00	94.60	99.65	99.95	99.95	17.55	44.35	68.35	85.55	97.75	99.95	99.95
	par./ HF-corr.	12.40	43.55	74.10	90.65	99.35	99.95	99.95	10.05	33.10	60.10	79.40	96.40	99.65	99.95
	multivariate	1.90	38.20	77.75	92.15	98.25	99.95	99.95	1.45	33.40	69.30	89.10	98.60	99.95	99.95
	Puri & Sen	16.30	43.20	68.75	85.25	97.75	99.95	99.95	16.30	43.20	68.75	85.25	97.75	99.95	99.95
	ATS	14.10	44.15	74.25	90.70	99.35	99.95	99.95	7.60	20.05	41.35	60.90	87.20	97.40	99.55
	Koch	0.70	33.00	76.00	91.60	98.25	99.80	99.90	0.25	28.25	65.90	88.30	98.55	99.85	99.95
	GLMM	0.60	1.20	9.94	34.64	86.24	99.50	100.0	3.30	4.13	8.88	23.94	73.99	99.69	100.00

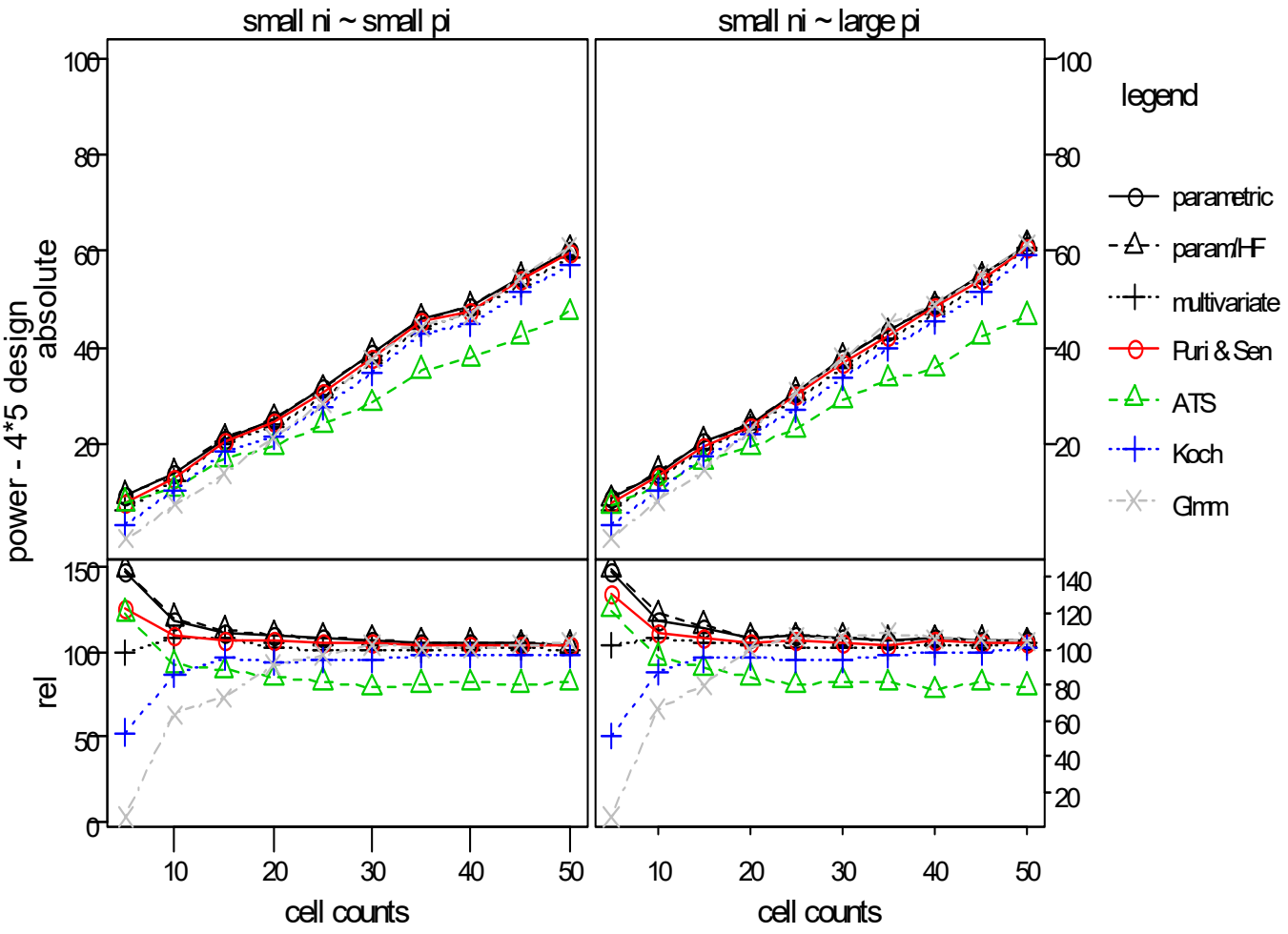

equal n
unequal n
power - 2*4 design
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 3. Main effect B (effects b_i = 0.3*s) A significant (effects a_i = 0.4*s) small n_i ~ small p_i and small n_i ~ large p_i

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

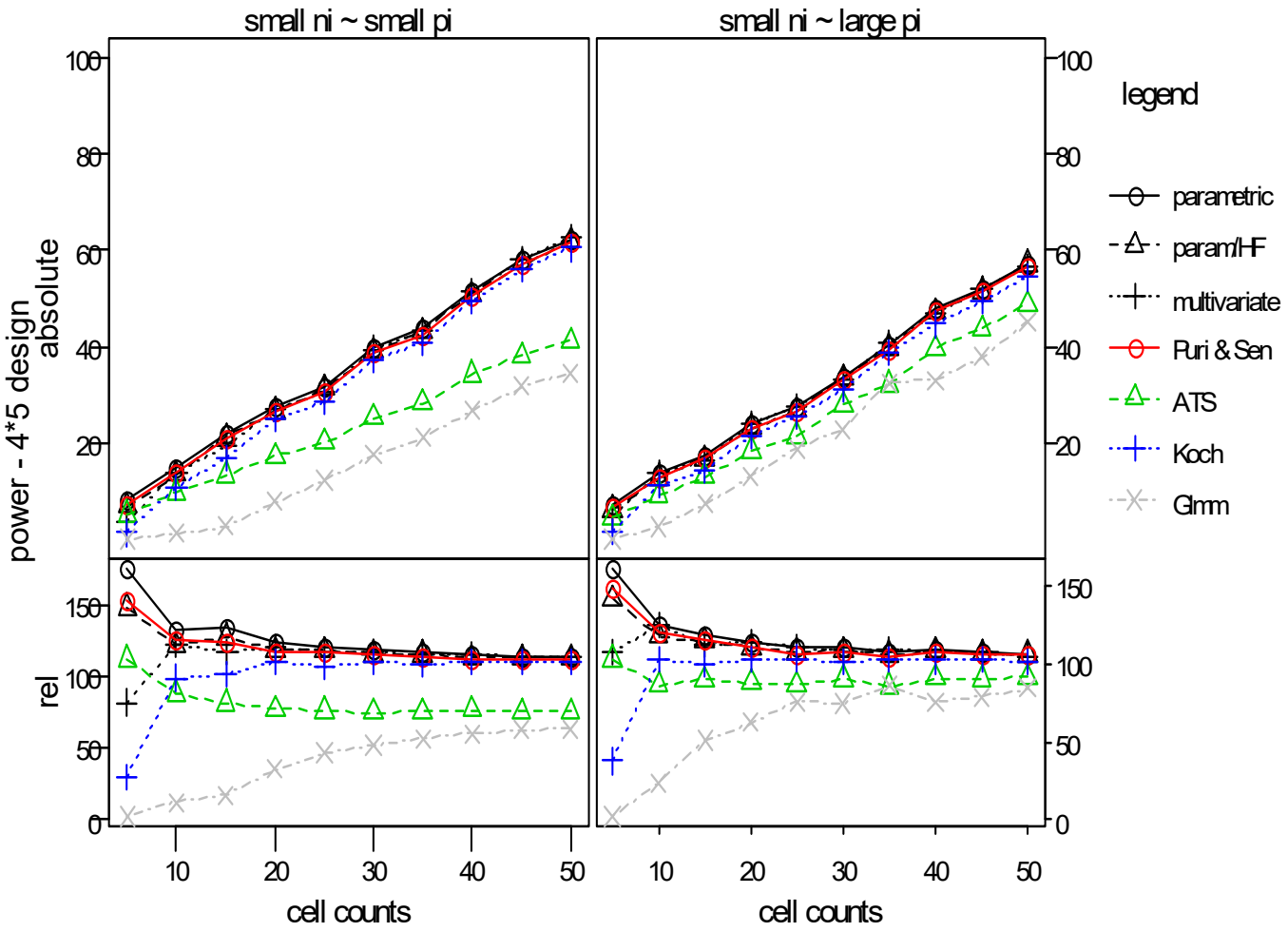
4. 3. 1. 1 p = 0.5

		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	9.20	13.75	21.05	25.25	38.55	48.30	60.30	8.60	13.95	20.35	24.10	37.75	49.00	61.35
	par./ HF-corr.	9.30	13.90	21.25	25.25	38.70	48.40	60.30	8.65	14.35	20.55	24.20	37.70	48.85	61.30
	multivariate	6.25	12.45	20.35	23.50	36.65	47.15	58.80	6.10	12.70	18.80	23.40	35.60	46.85	60.85
	Puri & Sen	7.85	12.75	20.20	24.40	37.75	47.40	59.75	7.80	13.10	19.30	23.50	36.65	48.25	60.80
	ATS	7.70	10.70	16.80	19.50	28.45	37.50	47.20	7.30	11.45	16.20	19.25	29.10	35.45	46.50
	Koch	3.30	10.10	18.20	21.55	34.60	44.75	56.90	3.10	10.40	17.15	21.75	33.50	45.40	59.25
	GLMM	0.20	7.30	13.80	21.20	37.50	46.80	61.00	0.40	8.00	14.50	22.80	37.70	48.80	61.20


small ni ~ small pi
small ni ~ large pi
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

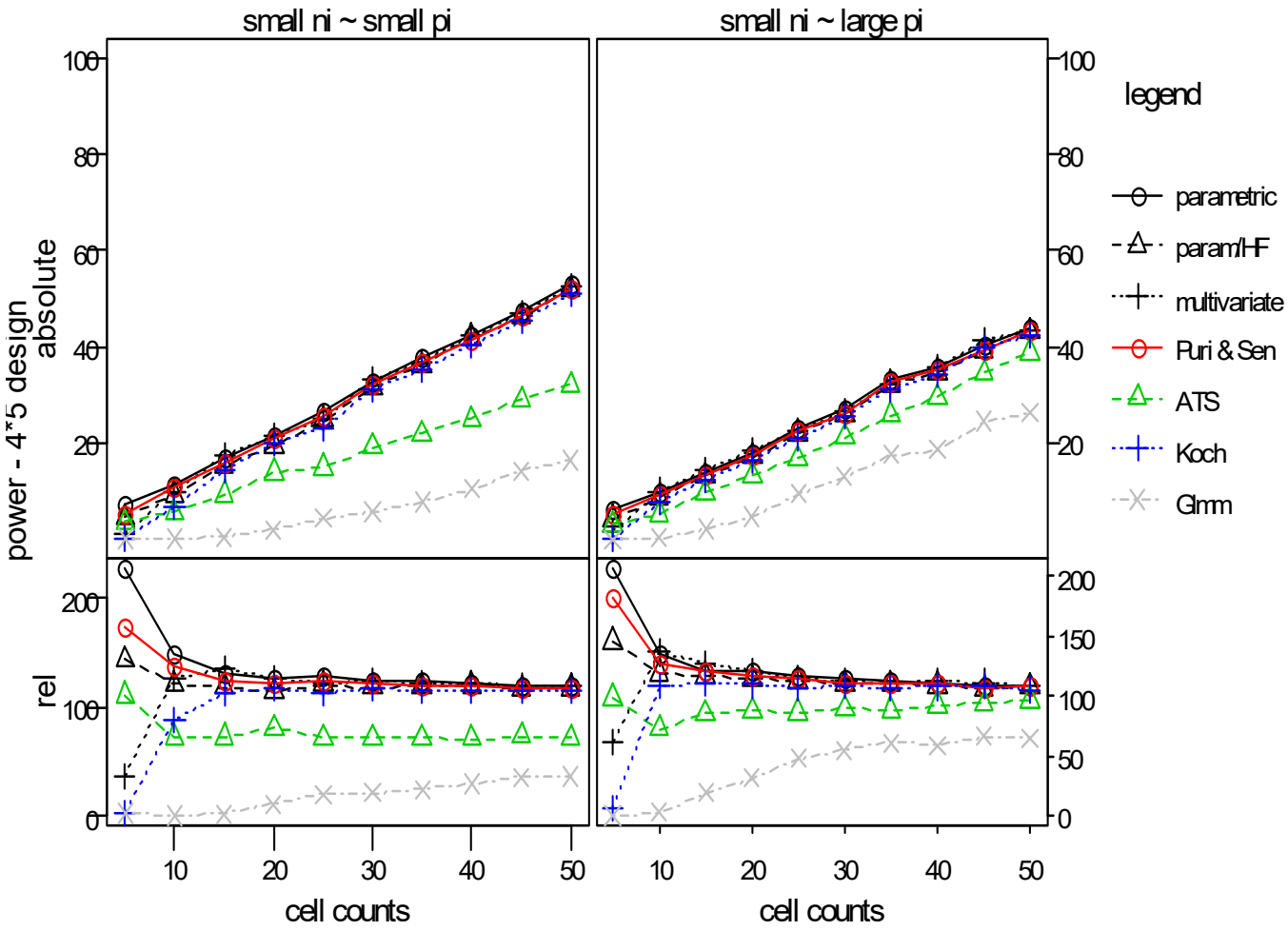
4. 3. 1. 2 p = 0.8

		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	8.15	14.75	22.20	27.60	39.90	51.65	62.25	7.05	13.65	17.30	24.00	33.90	47.7	57.20
	par./ HF-corr.	6.90	13.50	21.20	26.50	38.95	50.70	61.85	6.20	12.80	16.65	23.20	33.40	47.3	57.05
	multivariate	3.80	13.60	19.45	27.00	39.50	51.50	62.40	4.70	13.60	16.30	23.85	33.25	46.8	56.35
	Puri & Sen	7.10	13.90	20.70	26.30	38.85	50.25	61.55	6.50	13.05	16.75	23.20	33.10	47.2	56.70
	ATS	5.20	9.75	13.45	17.30	25.25	34.15	41.15	4.50	9.35	13.05	18.45	27.85	39.7	48.85
	Koch	1.40	10.95	16.80	24.85	37.05	49.25	60.40	1.65	11.15	14.50	21.65	31.15	44.6	54.30
	GLMM	0.10	1.30	2.80	7.91	17.52	26.63	34.53	0.10	2.60	7.40	13.20	22.90	33.0	45.30


small ni ~ small pi
small ni ~ large pi
power - 4*5 design absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 3. 1. 3 p = 0.9

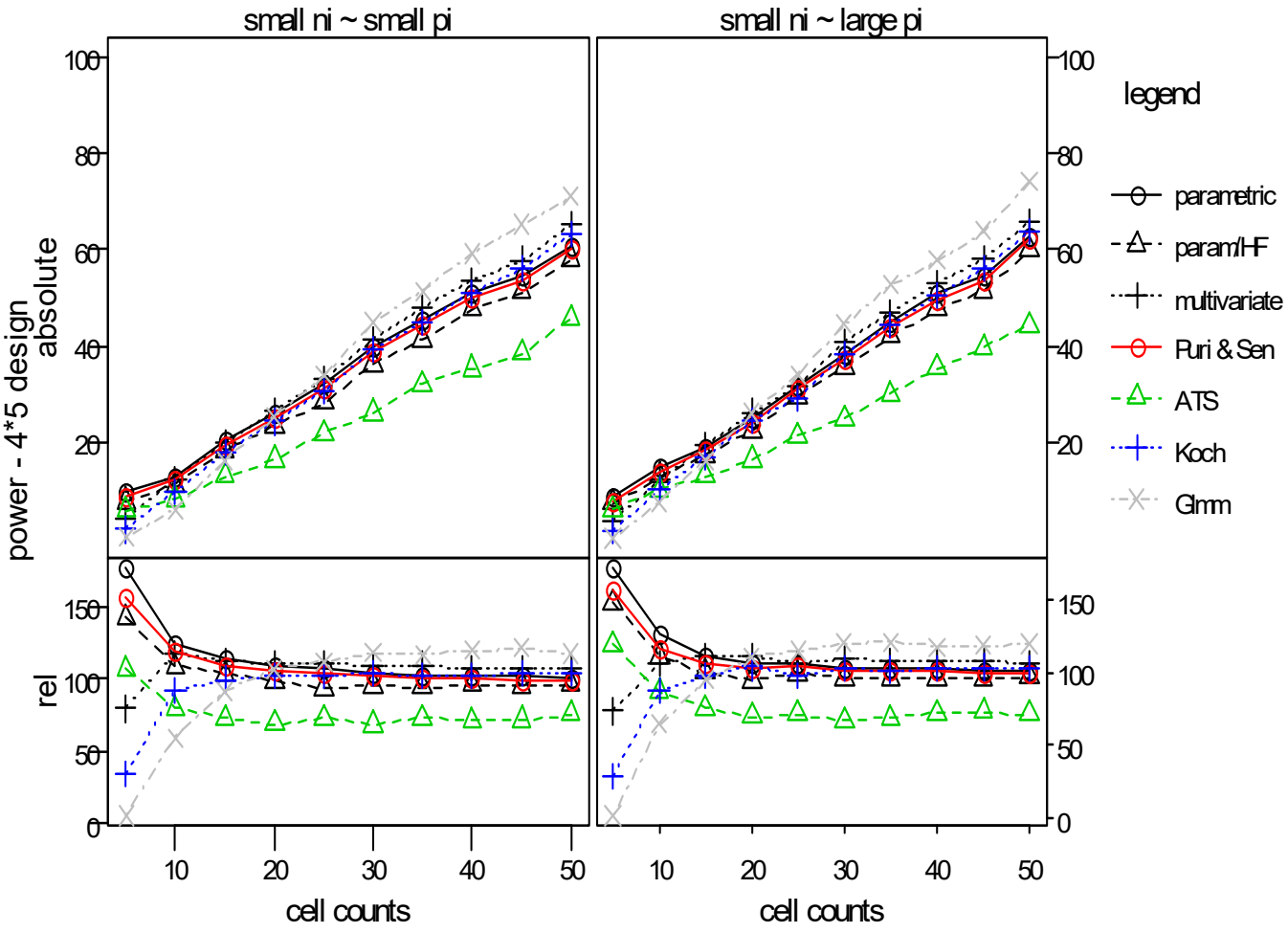
		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	7.05	11.50	16.95	21.55	32.85	42.30	53.05	6.10	9.85	13.70	18.05	27.05	35.45	43.85
	par./ HF-corr.	4.45	9.30	15.25	19.55	31.45	41.85	51.85	4.30	8.70	13.15	17.10	25.95	34.75	43.20
	multivariate	1.15	9.75	17.55	21.50	33.05	42.35	52.65	1.80	10.00	14.20	18.20	26.45	35.65	43.45
	Puri & Sen	5.40	10.65	16.05	20.70	32.10	41.50	52.00	5.35	9.35	13.55	17.55	26.20	35.20	43.50
	ATS	3.45	5.60	9.35	13.85	19.15	24.95	31.95	2.90	5.30	9.60	13.10	21.15	29.45	38.70
	Koch	0.10	6.80	14.55	20.00	31.25	40.40	51.15	0.20	7.95	12.45	16.45	25.45	34.30	42.25
	GLMM	0.10	0.10	0.40	2.00	5.71	10.51	16.32	0.00	0.20	2.10	4.70	12.90	18.60	26.10


small ni ~ small pi
small ni ~ large pi
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

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

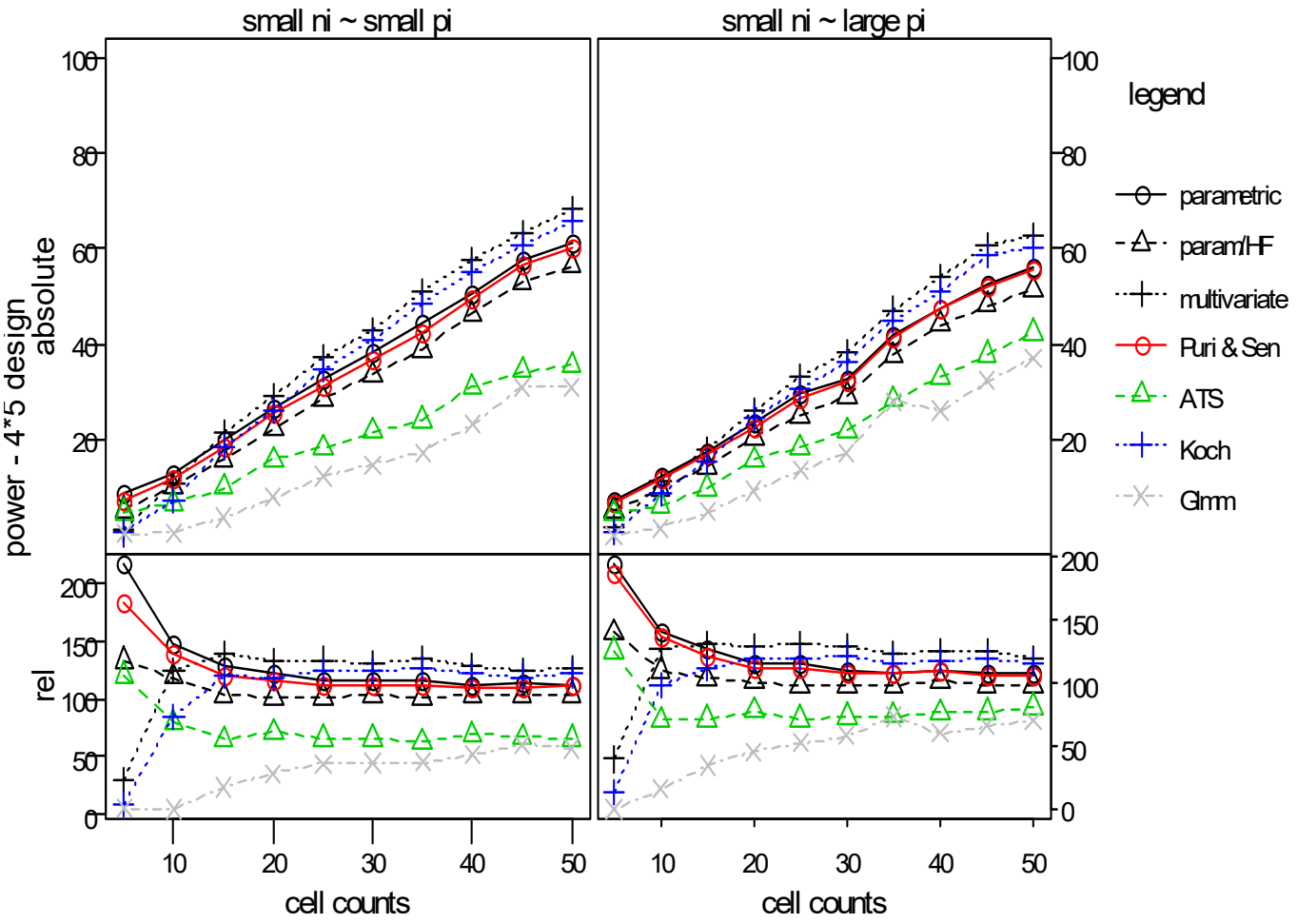
4. 3. 2. 1 p = 0.5

		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	9.70	12.90	20.30	25.85	39.65	50.95	60.85	8.65	14.65	19.10	24.95	38.10	50.75	62.50
	par./ HF-corr.	7.80	11.20	18.40	23.30	36.25	47.60	58.15	7.45	13.00	17.20	22.30	35.80	47.60	59.75
	multivariate	4.35	12.15	19.90	26.45	41.15	53.35	65.20	3.70	12.35	19.20	26.25	40.75	53.00	65.75
	Puri & Sen	8.55	12.30	19.30	25.10	38.70	49.85	60.10	7.85	13.60	18.35	24.10	37.25	49.45	61.95
	ATS	5.85	8.25	13.00	16.35	26.00	35.15	45.80	6.00	10.10	13.00	16.40	24.85	35.35	44.25
	Koch	1.90	9.55	17.75	24.25	39.15	50.80	63.05	1.45	10.15	16.85	24.40	38.05	50.55	63.70
	GLMM	0.30	6.10	16.30	25.40	44.80	59.10	71.00	0.10	7.50	16.30	26.00	44.50	57.80	74.00


small ni ~ small pi
small ni ~ large pi
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

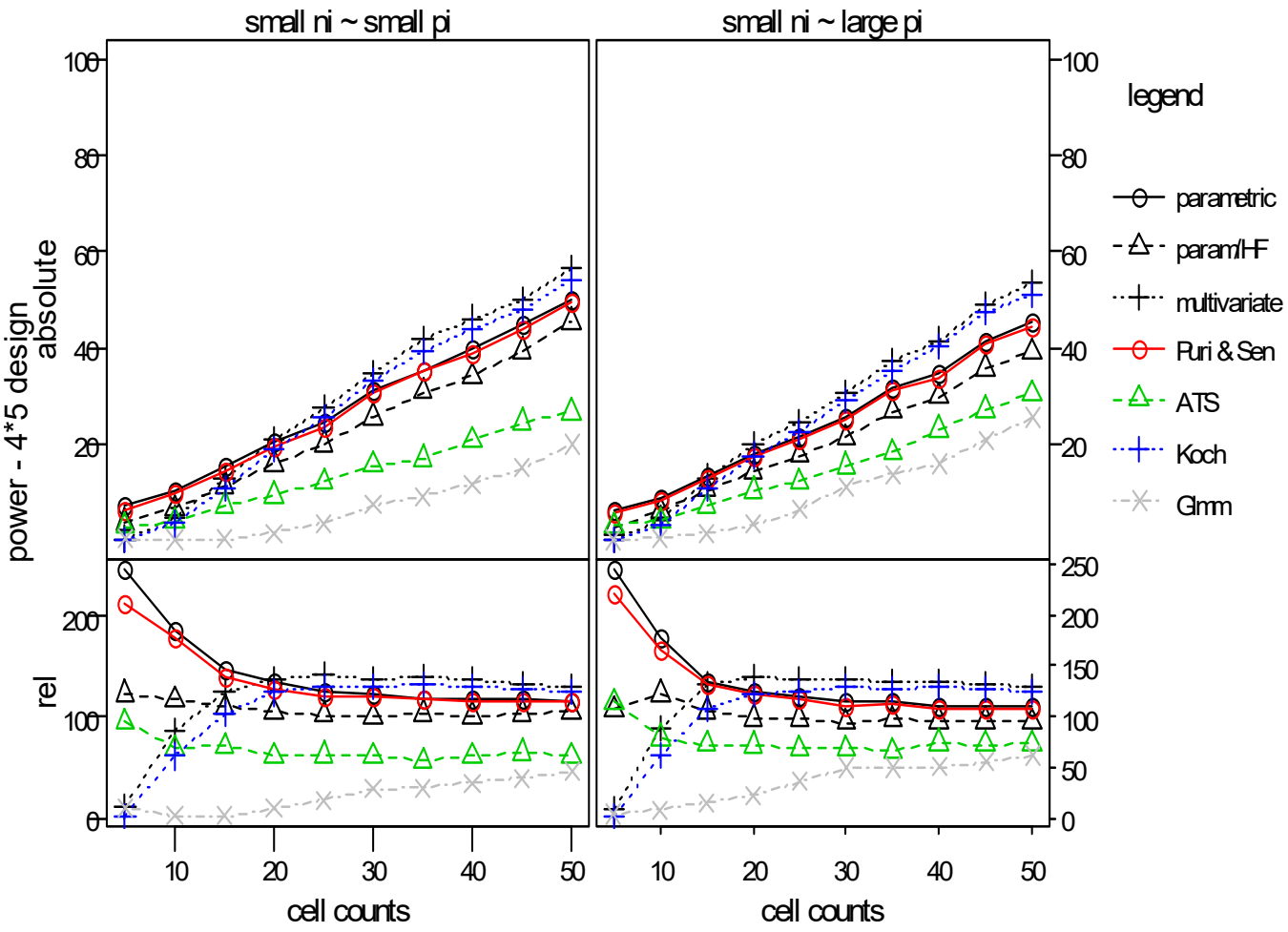
4. 3. 2. 2 p = 0.8

		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	8.55	12.65	19.70	26.65	38.30	50.60	61.10	7.15	12.35	17.55	23.45	32.50	47.50	56.25
	par./ HF-corr.	5.25	10.20	15.75	22.20	33.55	46.30	56.20	5.15	9.60	14.35	20.45	29.10	44.00	51.30
	multivariate	1.20	10.65	21.25	29.10	42.90	57.60	68.20	1.45	11.10	18.05	26.15	38.15	53.75	62.75
	Puri & Sen	7.20	11.85	18.35	25.50	36.90	49.35	60.10	6.85	11.90	16.90	22.60	32.10	47.15	55.45
	ATS	4.75	6.80	9.90	15.60	21.60	30.90	35.55	4.60	6.15	9.85	15.80	21.75	33.00	42.35
	Koch	0.35	7.25	18.50	25.90	40.80	55.25	65.80	0.50	8.55	15.50	24.30	36.20	51.10	60.10
	GLMM	0.20	0.40	3.60	7.81	14.61	23.12	31.03	0.00	1.40	4.80	9.20	17.20	26.00	37.00


small ni ~ small pi
small ni ~ large pi
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 3. 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	7.20	10.35	15.15	20.35	31.35	39.60	50.05	6.30	8.80	13.35	17.85	25.65	34.55	45.20
	par./ HF-corr.	3.60	6.50	11.35	15.85	25.55	34.05	45.40	2.75	6.10	10.45	14.10	21.25	29.80	39.05
	multivariate	0.30	4.85	12.80	20.80	34.65	46.10	56.40	0.20	4.40	13.05	19.75	30.65	41.50	53.30
	Puri & Sen	6.20	9.90	14.45	19.45	30.35	38.90	49.40	5.70	8.25	13.00	17.50	25.05	33.75	44.30
	ATS	2.80	3.85	7.35	9.30	15.55	20.80	26.55	2.95	3.95	7.15	10.25	15.35	23.05	30.35
	Koch	0.05	3.40	10.65	18.80	33.00	44.00	54.05	0.05	3.05	10.70	17.60	29.00	40.10	51.10
	GLMM	0.30	0.10	0.20	1.40	7.40	11.70	19.90	0.10	0.40	1.50	3.30	11.22	15.83	25.55

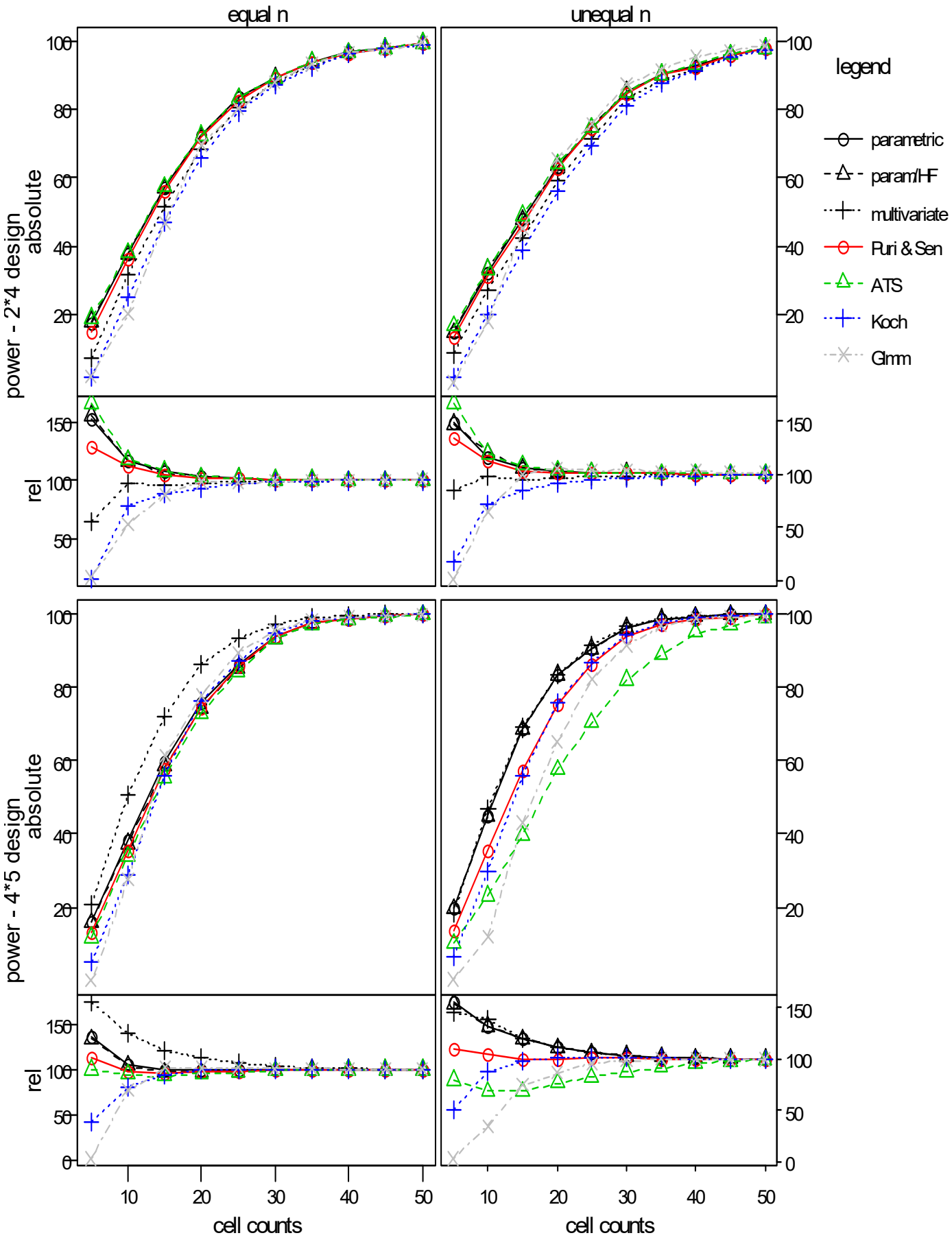

small ni ~ small pi
small ni ~ large pi
power - 4*5 design absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 4. Interaction effect AB (effects ab_{ij} = 0.4*s)

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

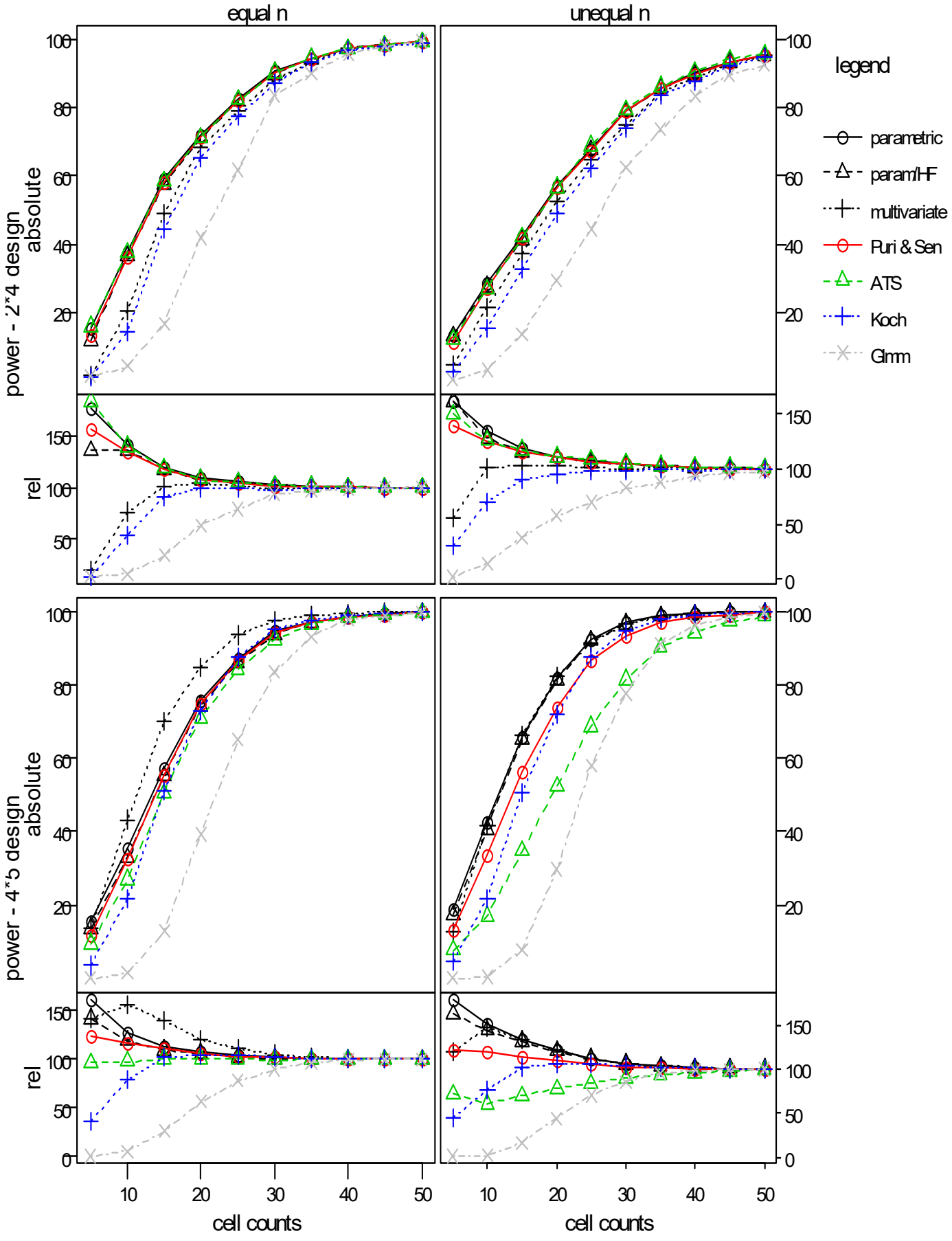
4. 4. 1. 1 p = 0.5

		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	17.45	37.50	57.05	72.30	89.15	96.60	99.25	14.75	32.20	47.75	63.40	84.80	92.60	97.65
	par./ HF-corr.	17.85	37.65	56.95	72.20	89.05	96.55	99.25	14.65	33.30	47.75	63.40	85.10	92.70	97.70
	multivariate	7.35	31.40	51.30	68.40	87.90	96.45	98.95	8.50	27.00	42.45	59.05	82.90	91.60	97.45
	Puri & Sen	14.80	36.10	56.10	71.60	88.85	96.45	99.20	13.40	31.15	46.45	62.60	84.70	92.40	97.60
	ATS	19.00	38.00	57.50	72.45	89.00	96.55	99.25	16.60	33.15	48.95	63.95	84.80	93.05	97.70
	Koch	1.75	25.25	47.10	65.55	87.25	96.15	98.85	1.80	19.85	38.60	56.25	81.00	91.00	97.30
	GLMM	1.90	20.00	46.70	69.60	88.00	96.50	99.40	0.10	17.90	44.90	65.40	87.30	95.20	98.70
4*5	parametric	16.15	38.15	59.45	75.60	93.85	98.70	99.85	17.75	38.85	58.90	76.15	93.95	98.80	99.80
	par./ HF-corr.	15.80	37.45	58.40	74.20	93.40	98.60	99.80	17.45	37.75	58.05	75.05	93.55	98.70	99.70
	multivariate	20.75	50.60	72.00	86.10	97.35	99.55	99.95	18.30	47.40	69.45	84.10	96.95	99.20	99.90
	Puri & Sen	13.35	35.35	57.65	74.50	93.65	98.65	99.80	13.85	35.70	57.40	75.35	93.80	98.75	99.80
	ATS	11.85	34.00	55.45	72.85	93.15	98.50	99.80	11.25	19.75	32.65	47.35	74.20	90.75	96.80
	Koch	4.95	29.00	55.95	76.20	94.85	99.25	99.90	6.20	30.05	55.50	75.70	94.65	99.30	99.80
	GLMM	0.10	27.60	61.30	77.70	95.40	99.10	99.90	0.40	11.90	43.10	65.20	91.50	98.80	99.40


equal n
unequal n
power - 2*4 design
power - 4*5 design
absolute
rel
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

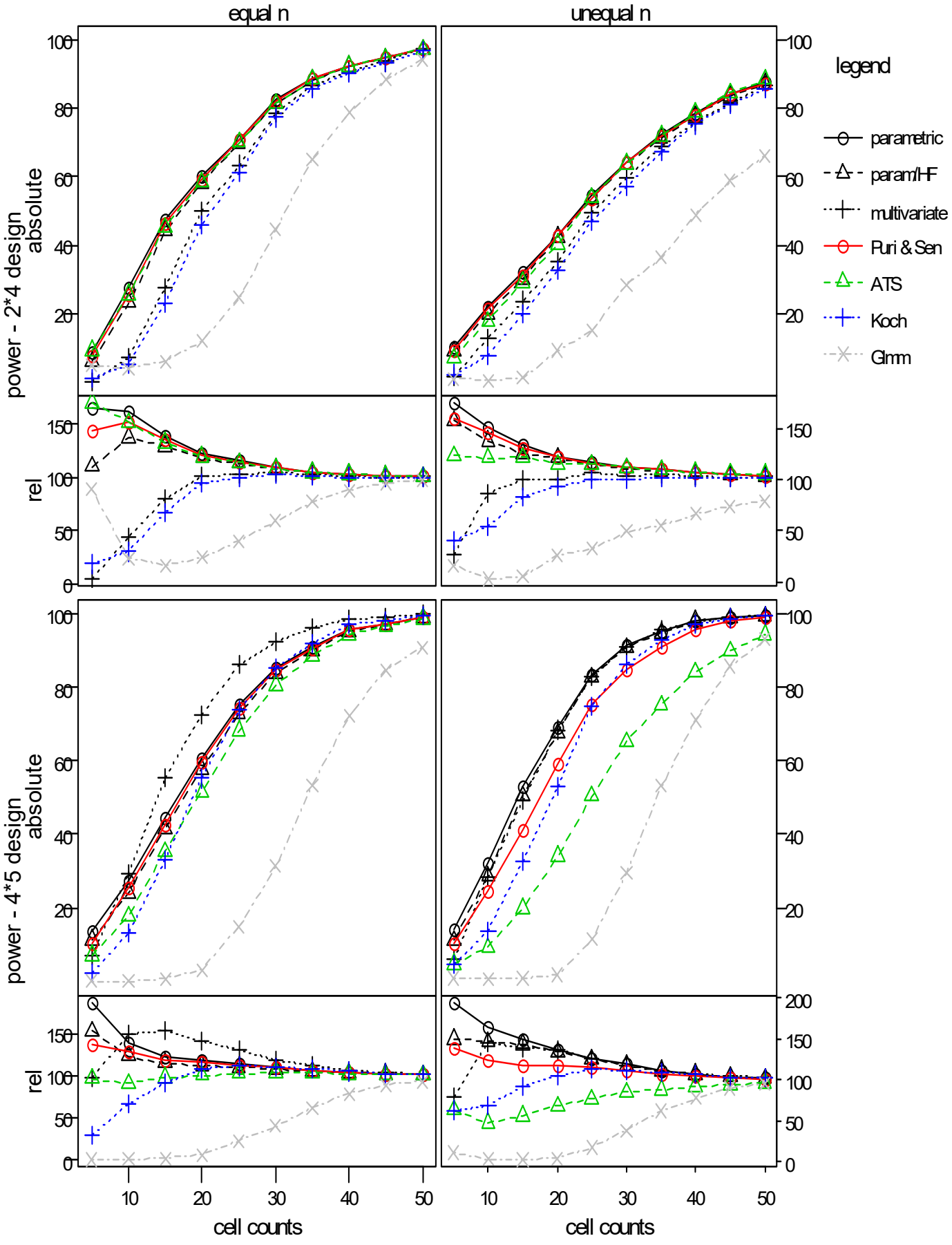
4. 4. 1. 2 p = 0.8

		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	15.25	37.95	58.85	71.55	90.45	97.25	99.20	13.10	28.70	42.30	57.05	79.15	89.90	95.05
	par./ HF-corr.	11.75	36.55	57.65	71.00	90.20	97.10	99.15	13.10	27.55	41.40	56.40	78.70	89.70	95.10
	multivariate	1.65	20.45	49.10	68.00	88.20	97.00	98.80	4.50	21.60	37.20	52.35	74.95	88.55	94.95
	Puri & Sen	13.55	36.25	58.20	71.15	89.95	97.15	99.20	11.30	27.00	41.55	56.40	78.90	89.60	94.95
	ATS	15.85	37.50	58.40	71.20	90.25	97.15	99.20	12.15	26.95	42.00	56.65	79.30	90.50	95.50
	Koch	1.15	14.40	44.25	65.05	87.10	96.85	98.80	2.50	15.15	32.55	48.95	73.70	87.70	94.65
	GLMM	1.21	4.33	16.70	41.75	83.50	95.47	99.30	0.20	3.10	13.70	29.50	62.50	83.40	92.30
4*5	parametric	15.65	35.25	57.20	76.00	94.75	98.75	99.90	16.40	36.50	58.10	75.00	93.60	98.60	99.90
	par./ HF-corr.	13.75	32.95	55.20	74.45	93.70	98.65	99.80	14.85	33.75	55.60	73.35	93.00	98.15	99.90
	multivariate	13.70	43.30	70.00	84.70	97.50	99.70	99.95	12.85	40.70	66.60	82.30	96.90	99.45	99.95
	Puri & Sen	11.95	32.40	55.45	74.70	94.25	98.70	99.90	12.95	33.70	56.15	73.70	93.45	98.45	99.90
	ATS	9.35	27.00	50.50	70.90	92.50	98.45	99.75	8.15	14.55	28.30	42.20	72.55	88.20	96.30
	Koch	3.45	21.85	51.20	73.15	95.50	99.20	99.95	4.30	23.30	51.05	73.10	95.40	99.30	99.95
	GLMM	0.00	1.40	12.90	39.30	83.50	97.90	99.90	0.10	0.40	7.90	29.80	77.70	96.30	99.70


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 4. 1. 3 p = 0.9

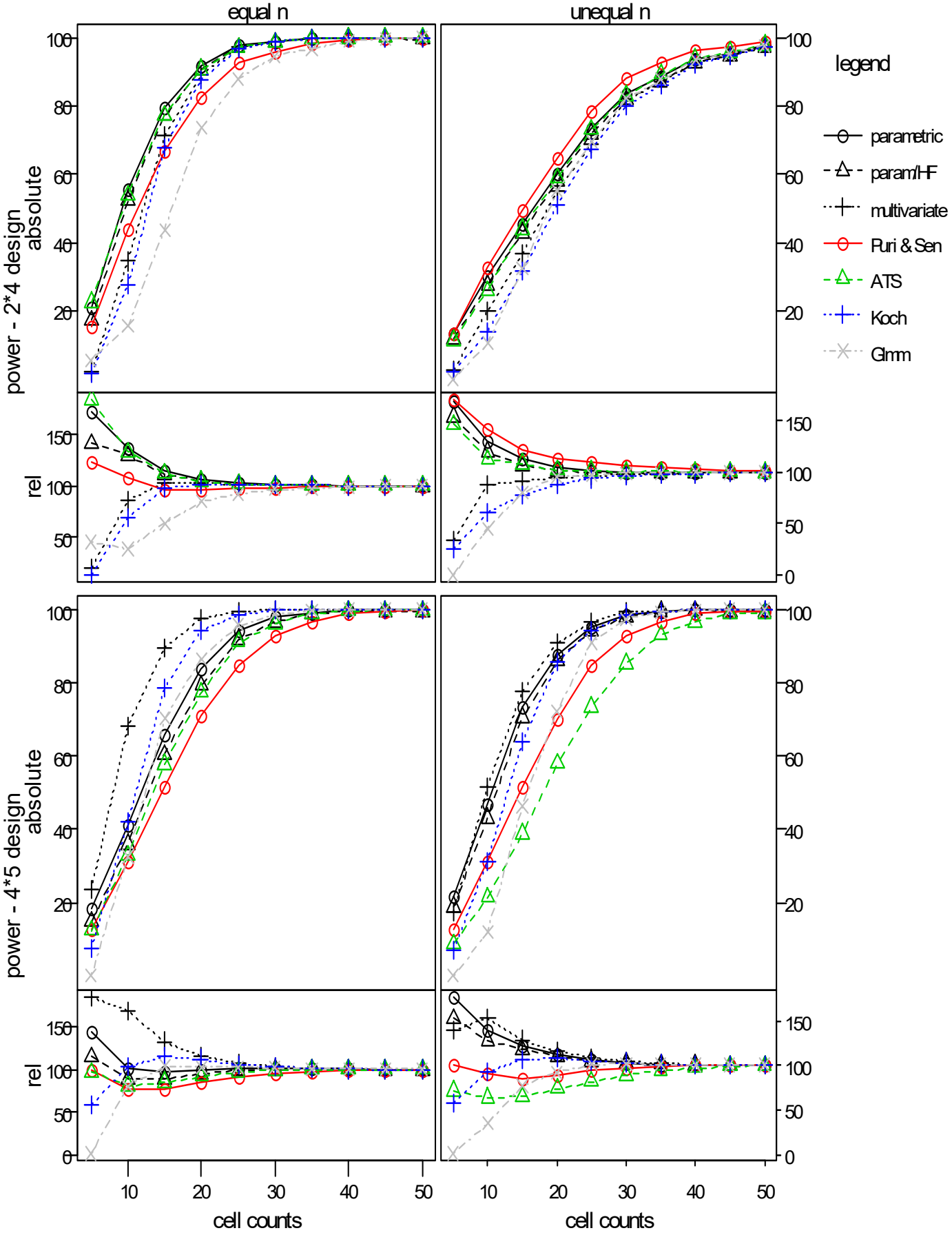
		equal cell counts							unequal cell counts						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
2*4	parametric	8.90	27.35	47.50	59.95	82.30	92.40	97.10	10.15	22.05	32.20	43.00	64.40	78.60	87.55
	par./ HF-corr.	5.95	23.20	44.05	57.95	81.35	92.10	97.10	9.15	20.05	30.00	42.45	63.50	77.80	87.10
	multivariate	0.25	7.40	27.45	49.90	78.40	90.65	97.05	1.55	12.60	23.70	35.30	59.40	76.10	86.30
	Puri & Sen	7.80	25.75	46.30	58.85	81.95	92.20	97.10	9.30	21.30	31.05	42.60	64.05	78.15	87.15
	ATS	9.20	25.60	45.20	58.45	81.40	92.15	97.10	7.15	17.65	29.05	40.25	63.80	78.65	88.25
	Koch	1.00	5.05	22.85	46.05	77.15	89.95	96.90	2.35	7.80	19.85	32.55	57.15	75.15	85.35
	GLMM	4.81	3.99	5.94	11.98	44.52	78.51	94.06	0.90	0.40	1.20	9.20	28.40	48.70	66.10
4*5	parametric	13.80	27.45	44.35	60.60	85.30	95.95	99.00	14.45	28.55	46.20	62.90	88.10	97.05	99.25
	par./ HF-corr.	11.25	24.20	41.45	57.90	83.90	95.15	98.85	11.35	25.60	44.20	61.45	87.00	96.60	99.15
	multivariate	7.20	29.45	55.55	72.45	92.30	98.50	99.95	7.25	28.00	51.70	69.50	90.75	97.75	99.65
	Puri & Sen	10.15	25.30	42.55	59.70	84.80	95.90	99.00	10.30	24.35	41.40	59.25	84.95	95.95	99.15
	ATS	7.10	17.85	35.35	51.55	80.65	94.20	98.60	6.00	8.35	17.85	29.25	57.70	79.55	91.80
	Koch	2.20	13.15	33.15	55.20	85.45	97.10	99.45	4.50	14.20	32.35	53.55	85.80	97.20	99.35
	GLMM	0.00	0.10	0.60	3.00	31.40	72.10	90.90	0.80	0.60	0.80	1.81	29.38	71.03	92.96


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

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

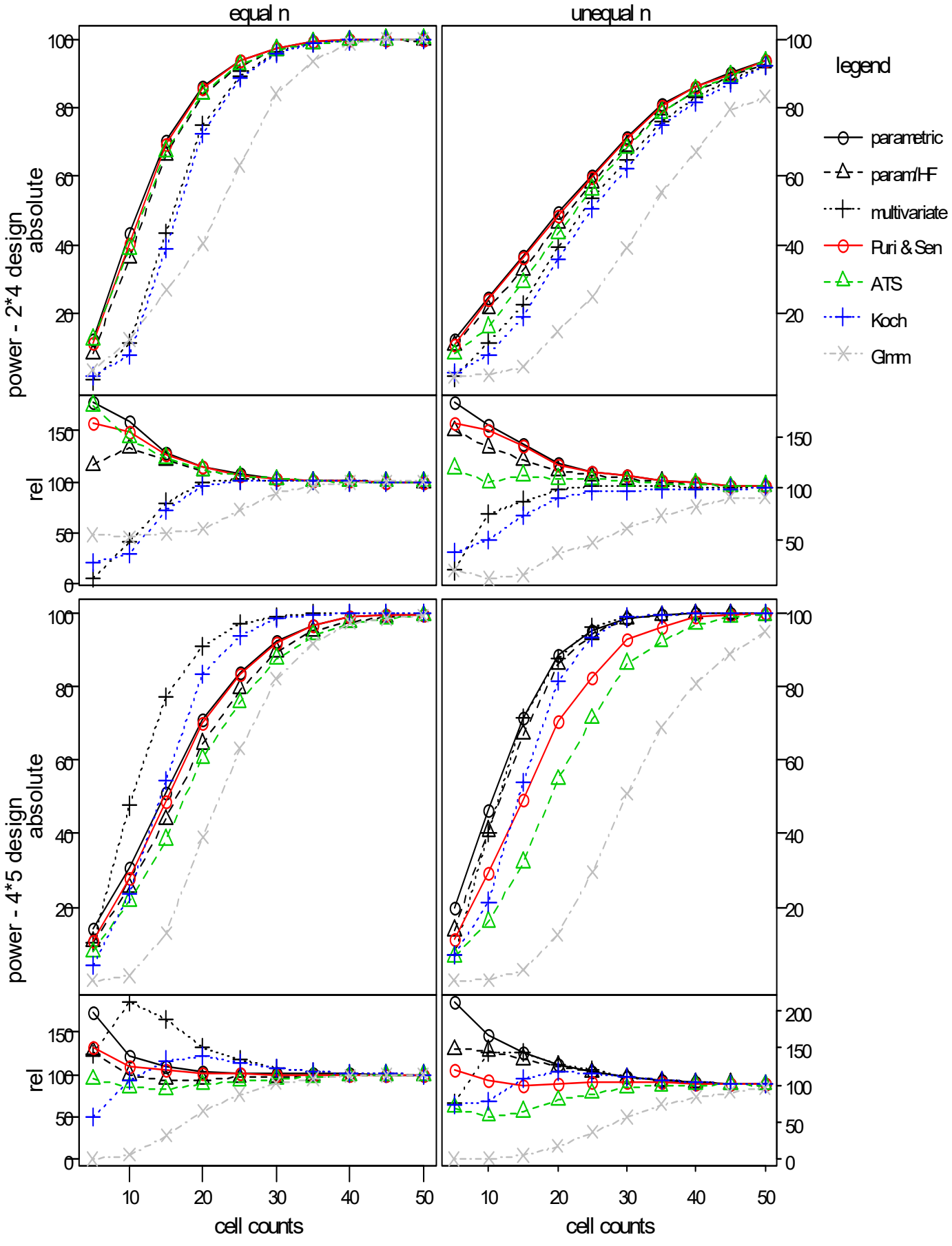
4. 4. 2. 1 p = 0.5

		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	21.15	55.75	79.20	91.55	98.80	99.95	99.95	13.10	29.95	45.40	60.10	83.30	93.50	97.55
	par./ HF-corr.	17.30	52.40	77.10	90.60	98.65	99.95	99.95	11.90	27.60	42.80	58.20	81.90	92.60	97.20
	multivariate	2.35	34.45	71.45	89.20	98.70	99.95	99.95	2.60	20.05	36.80	54.90	81.40	92.55	97.20
	Puri & Sen	15.10	43.65	66.80	82.45	95.85	99.45	99.95	13.20	32.65	49.30	64.75	87.90	96.00	99.00
	ATS	22.55	53.85	77.25	90.65	98.65	99.90	99.95	11.35	25.85	43.80	58.85	82.95	93.80	97.85
	Koch	1.55	27.80	67.70	87.60	98.60	99.90	99.95	1.95	14.00	31.60	50.90	79.90	92.20	97.05
	GLMM	5.50	15.40	43.60	73.50	94.50	99.00	100.0	0.00	10.40	32.30	55.10	82.20	93.50	97.50
4*5	parametric	18.55	41.05	65.85	83.70	98.15	99.90	99.95	19.25	42.10	66.05	85.05	98.05	99.80	99.95
	par./ HF-corr.	14.75	35.95	60.45	79.30	96.50	99.75	99.95	16.05	37.00	60.45	79.40	97.20	99.60	99.90
	multivariate	23.75	68.25	89.75	97.45	99.95	99.95	99.95	23.10	64.20	86.75	97.05	99.95	99.95	99.95
	Puri & Sen	12.70	31.30	51.60	70.85	92.90	99.00	99.85	12.50	31.00	51.60	70.10	92.95	99.05	99.75
	ATS	12.45	33.00	57.75	77.45	96.05	99.75	99.95	12.35	20.35	34.00	49.50	79.55	94.55	98.80
	Koch	7.60	42.10	78.60	94.45	99.90	99.95	99.95	9.00	42.25	78.70	94.15	99.85	99.95	99.95
	GLMM	0.20	32.60	70.30	86.50	98.80	100.0	100.0	0.10	11.80	46.40	72.40	97.60	99.90	100.00


equal n
unequal n
power - 2*4 design
power - 4*5 design
absolute
rel
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

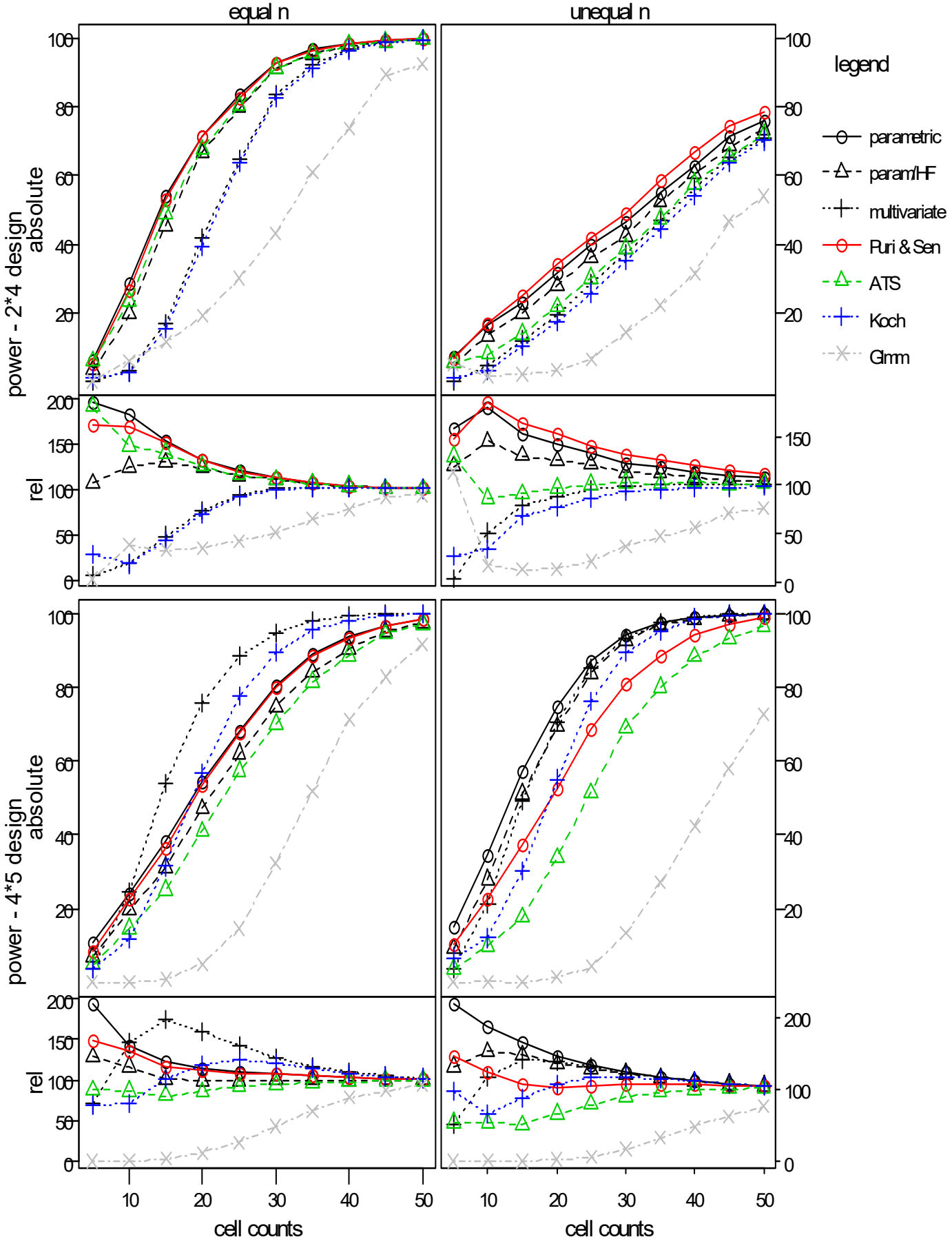
4. 4. 2. 2 p = 0.8

		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	12.50	43.30	70.30	86.00	97.25	99.60	99.95	12.40	24.70	36.60	49.25	71.45	86.25	93.65
	par./ HF-corr.	8.15	36.05	66.10	83.75	96.85	99.55	99.95	10.55	21.30	32.50	46.10	68.90	84.50	92.85
	multivariate	0.35	11.25	43.30	74.95	96.30	99.65	99.95	1.40	11.50	22.55	39.10	64.55	82.80	92.30
	Puri & Sen	11.05	40.45	69.35	85.75	97.15	99.60	99.95	11.00	23.80	36.05	48.40	71.00	85.95	93.55
	ATS	12.30	38.70	67.30	84.05	96.80	99.50	99.95	8.10	16.00	28.85	43.20	68.05	85.00	93.55
	Koch	1.45	7.70	38.95	72.20	95.90	99.55	99.95	2.60	7.60	18.80	35.85	62.10	81.60	92.10
	GLMM	3.34	12.25	26.62	40.28	84.01	98.58	100.0	1.41	2.02	4.23	14.62	39.01	67.14	83.06
4*5	parametric	14.35	30.90	51.00	71.20	92.60	99.05	99.70	14.55	31.50	50.30	71.65	93.05	99.00	99.80
	par./ HF-corr.	10.55	25.35	43.90	64.50	89.55	97.75	99.50	11.25	26.65	43.80	63.75	90.00	98.05	99.75
	multivariate	10.35	47.60	77.10	91.10	99.20	99.95	99.95	9.85	42.15	73.65	88.70	98.90	99.90	99.95
	Puri & Sen	10.95	28.00	49.00	70.10	92.05	98.90	99.70	11.30	29.35	49.10	70.60	92.80	98.95	99.80
	ATS	7.85	21.70	38.40	60.40	87.70	97.35	99.50	7.10	13.10	21.20	33.60	63.90	84.90	95.20
	Koch	4.10	23.75	54.55	83.50	98.75	99.95	99.95	6.15	24.40	53.85	82.55	98.80	99.95	99.95
	GLMM	0.00	1.30	12.80	39.00	82.20	97.40	99.40	0.05	0.30	2.80	12.50	50.80	80.90	95.00


equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 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	6.15	28.45	53.85	71.30	92.90	98.50	99.80	7.10	16.45	23.10	31.70	46.30	62.85	75.90
	par./ HF-corr.	3.35	19.60	45.35	66.55	91.10	97.85	99.70	5.35	13.20	19.70	28.00	42.45	60.35	73.45
	multivariate	0.15	2.90	17.00	41.60	83.55	96.90	99.40	0.20	4.70	12.00	19.65	37.05	55.80	71.00
	Puri & Sen	5.35	26.40	52.85	71.10	92.75	98.35	99.80	6.60	16.85	24.80	34.20	49.10	66.95	78.60
	ATS	6.00	23.20	49.05	67.55	91.25	97.80	99.70	5.80	7.90	13.80	21.75	38.70	57.60	71.95
	Koch	0.90	2.80	15.15	39.40	82.70	96.45	99.50	1.20	3.10	10.40	17.45	35.35	54.15	70.05
	GLMM	0.05	6.09	11.37	18.98	43.25	73.60	92.28	5.07	1.62	2.13	3.22	14.29	31.49	54.02
4*5	parametric	10.65	24.00	38.20	54.35	80.40	93.65	98.55	12.80	25.75	41.85	57.00	84.05	95.60	99.45
	par./ HF-corr.	7.05	19.55	31.25	47.25	74.75	90.50	97.50	8.60	20.95	35.10	51.15	79.40	93.35	98.70
	multivariate	3.85	24.45	54.15	75.70	94.85	99.45	99.95	4.55	24.15	50.15	70.60	92.60	99.00	99.95
	Puri & Sen	8.20	22.75	36.30	53.65	79.90	93.45	98.55	10.10	22.60	37.40	52.75	80.95	94.15	98.95
	ATS	4.80	14.55	25.05	40.95	70.15	88.65	97.25	4.25	7.70	13.75	22.80	48.20	69.55	87.65
	Koch	3.80	11.80	31.45	56.75	89.55	98.10	99.85	5.65	14.25	31.15	55.90	90.20	98.70	99.95
	GLMM	0.00	0.10	0.80	4.90	32.40	71.30	91.80	0.05	0.20	0.10	1.50	13.31	42.54	72.87

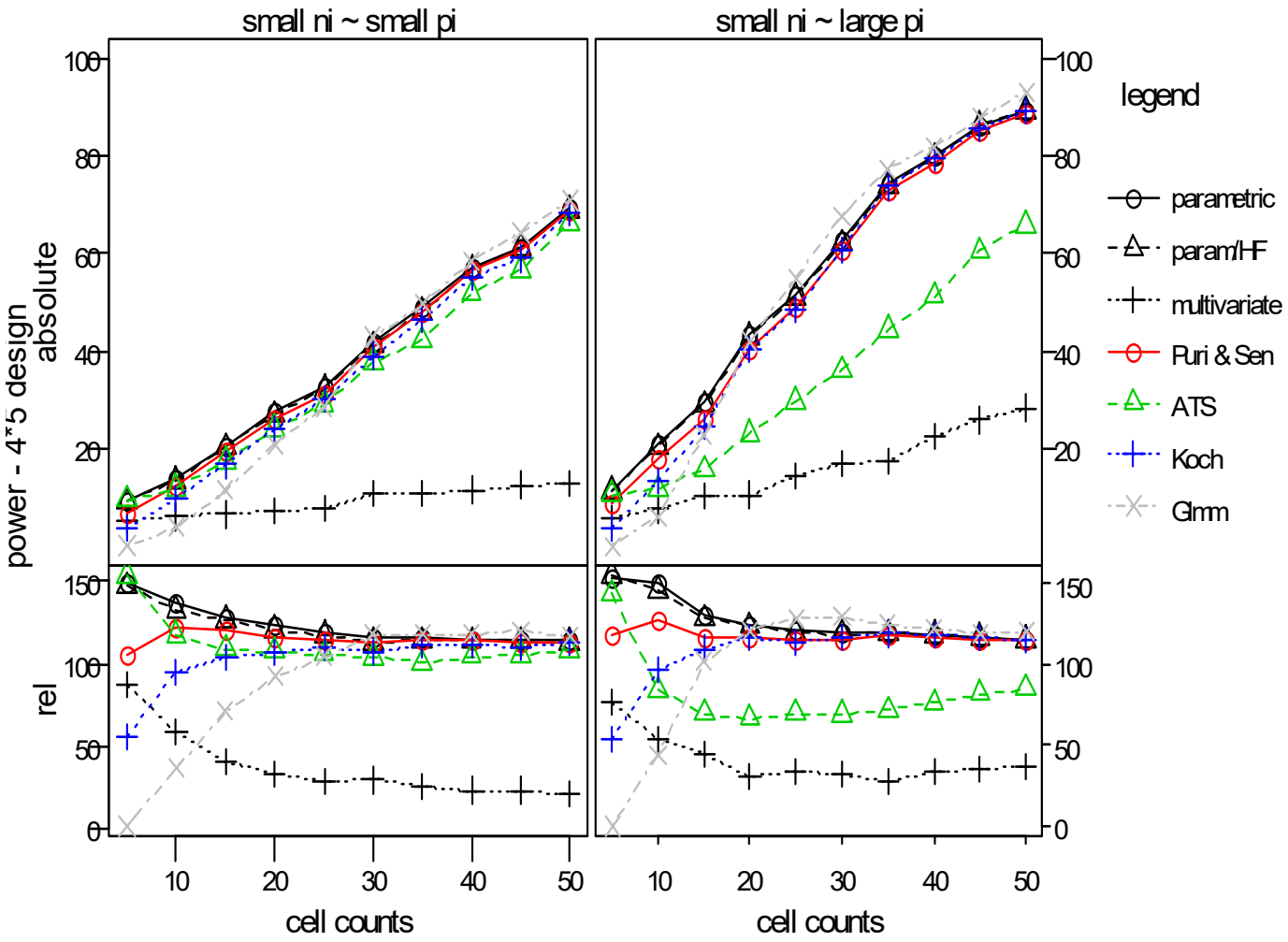

equal n
unequal n
power - 2*4 design
absolute
rel
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 5. Interaction effect AB (effects ab_i = 0.4*s) A significant (effects a_i = 0.4*s) small n_i ~ small p_i and small n_i ~ large p_i

4. 5. 1. equal correlations on B (r=0.3)

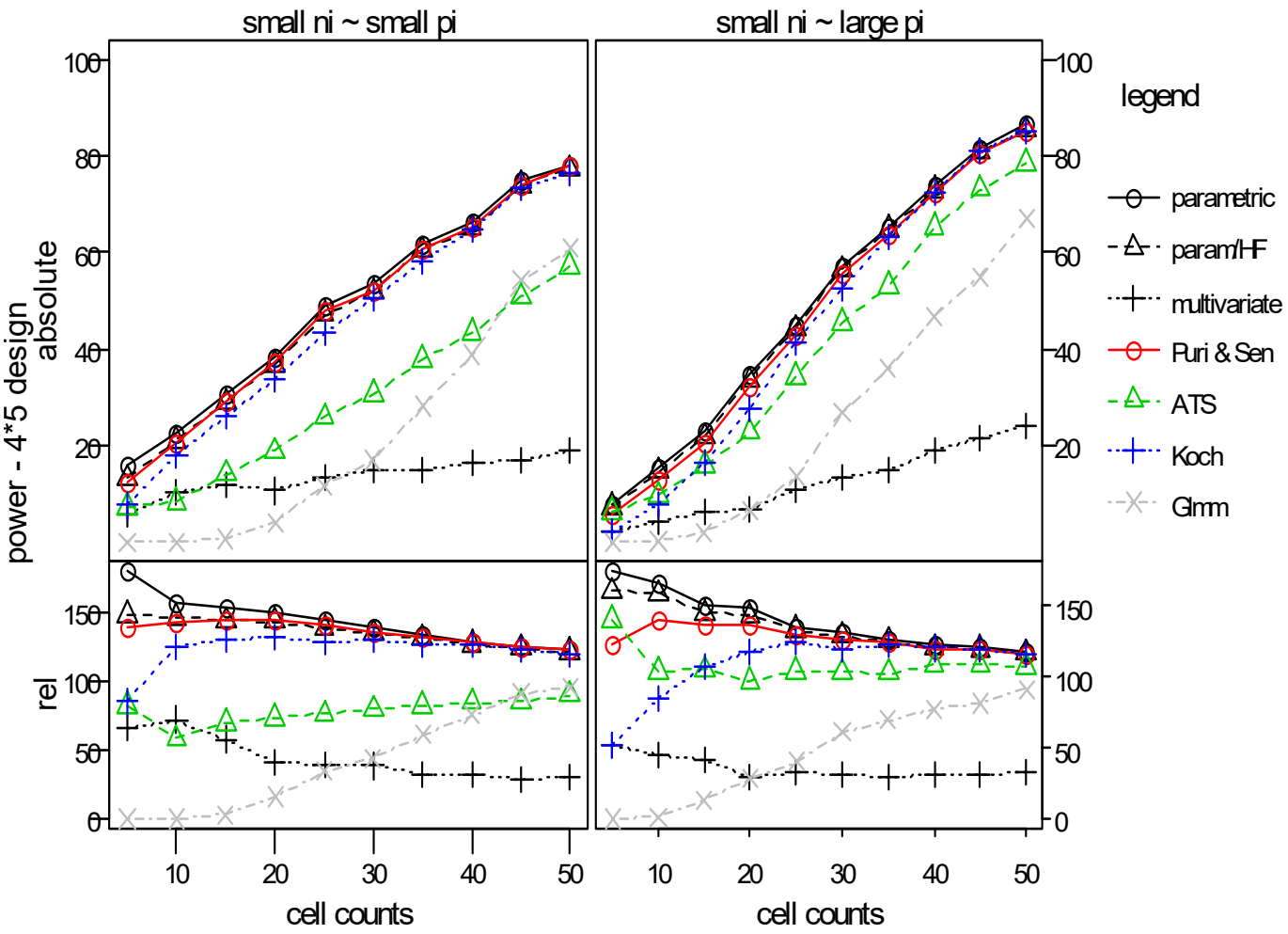
4. 5. 1. 1 p = 0.5

		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	9.15	13.85	20.45	27.50	41.90	56.90	69.35	11.15	20.85	29.35	43.15	62.45	79.70	89.20
	par./ HF-corr.	9.05	13.45	20.30	26.95	41.10	56.60	68.85	11.25	20.35	28.85	42.80	62.00	79.60	89.15
	multivariate	5.35	5.95	6.45	7.40	10.70	11.50	12.90	5.60	7.50	10.05	10.50	16.70	22.30	28.30
	Puri & Sen	6.50	12.30	19.35	25.95	41.00	56.55	68.85	8.60	17.65	26.25	40.40	60.40	78.60	88.60
	ATS	9.45	11.90	17.45	24.05	37.80	51.75	66.10	10.45	11.65	15.65	23.00	36.10	51.20	65.70
	Koch	3.45	9.65	16.65	24.05	38.95	55.00	68.45	3.85	13.45	24.65	40.40	60.65	79.25	89.05
	GLMM	0.10	3.70	11.40	20.70	42.80	58.40	70.80	0.00	6.10	22.80	41.80	67.60	81.90	93.00


small ni ~ small pi
small ni ~ large pi
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

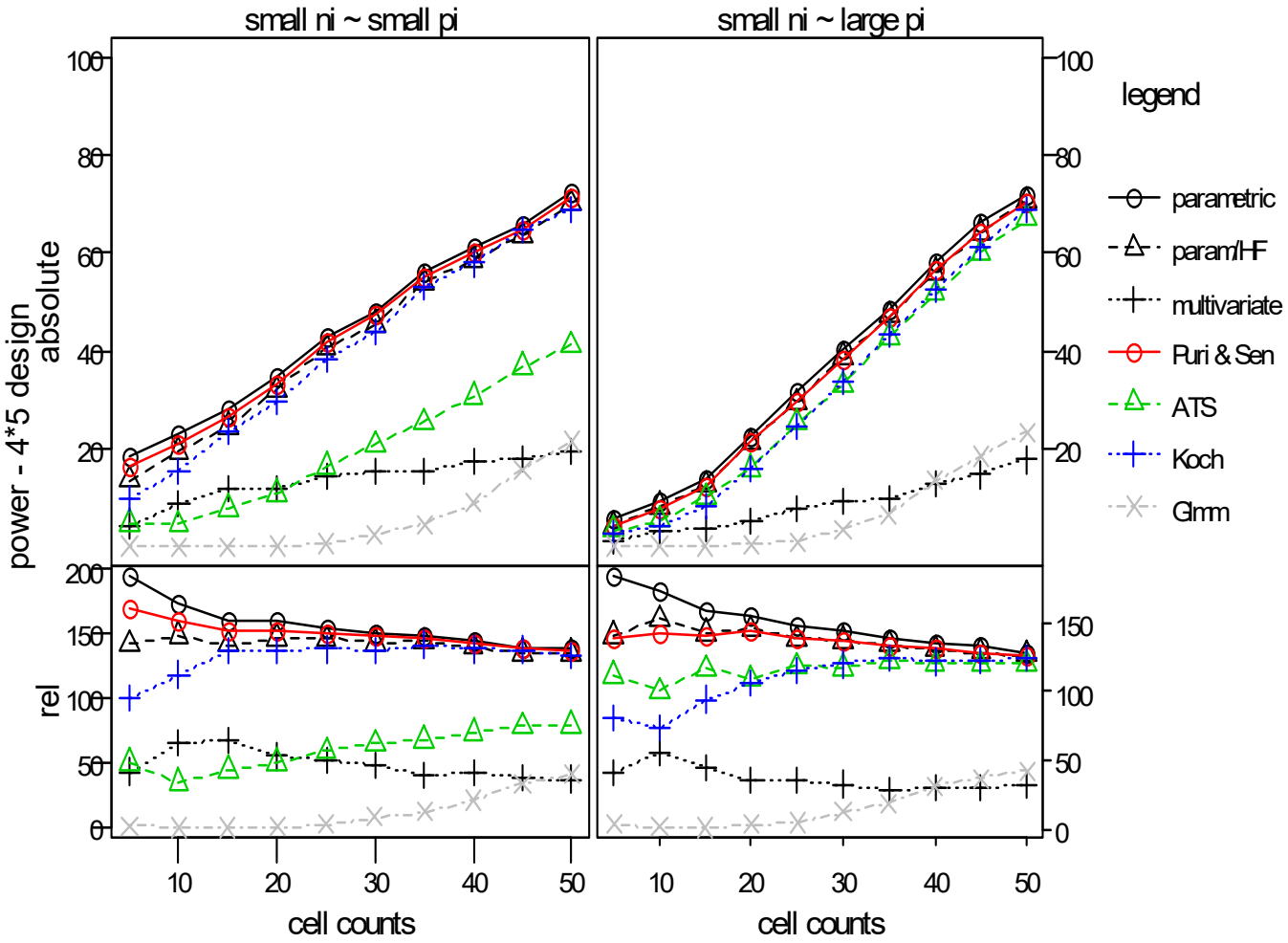
4. 5. 1. 2 p = 0.8

		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	15.95	22.55	30.65	38.45	53.50	66.05	78.10	7.85	15.20	22.80	34.90	57.25	73.70	86.35
	par./ HF-corr.	13.15	20.90	28.90	36.75	51.85	64.90	77.15	7.20	14.55	21.85	33.50	56.35	72.80	85.45
	multivariate	5.85	10.30	11.60	10.55	14.75	16.55	18.95	2.30	4.05	6.25	6.75	13.35	18.75	24.00
	Puri & Sen	12.35	20.35	29.00	37.10	52.15	65.40	77.75	5.50	12.85	20.60	32.15	55.35	72.35	85.10
	ATS	7.30	8.30	14.05	18.85	30.75	43.30	57.20	6.30	9.50	15.90	22.65	45.35	65.20	78.55
	Koch	7.50	17.80	26.10	33.90	50.25	64.70	76.25	2.30	7.80	16.30	27.45	52.35	72.50	85.20
	GLMM	0.00	0.00	0.60	4.10	16.90	38.70	60.80	0.00	0.10	2.00	6.50	26.60	46.70	66.80


small ni ~ small pi
small ni ~ large pi
power - 4*5 design absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 5. 1. 3 p = 0.9

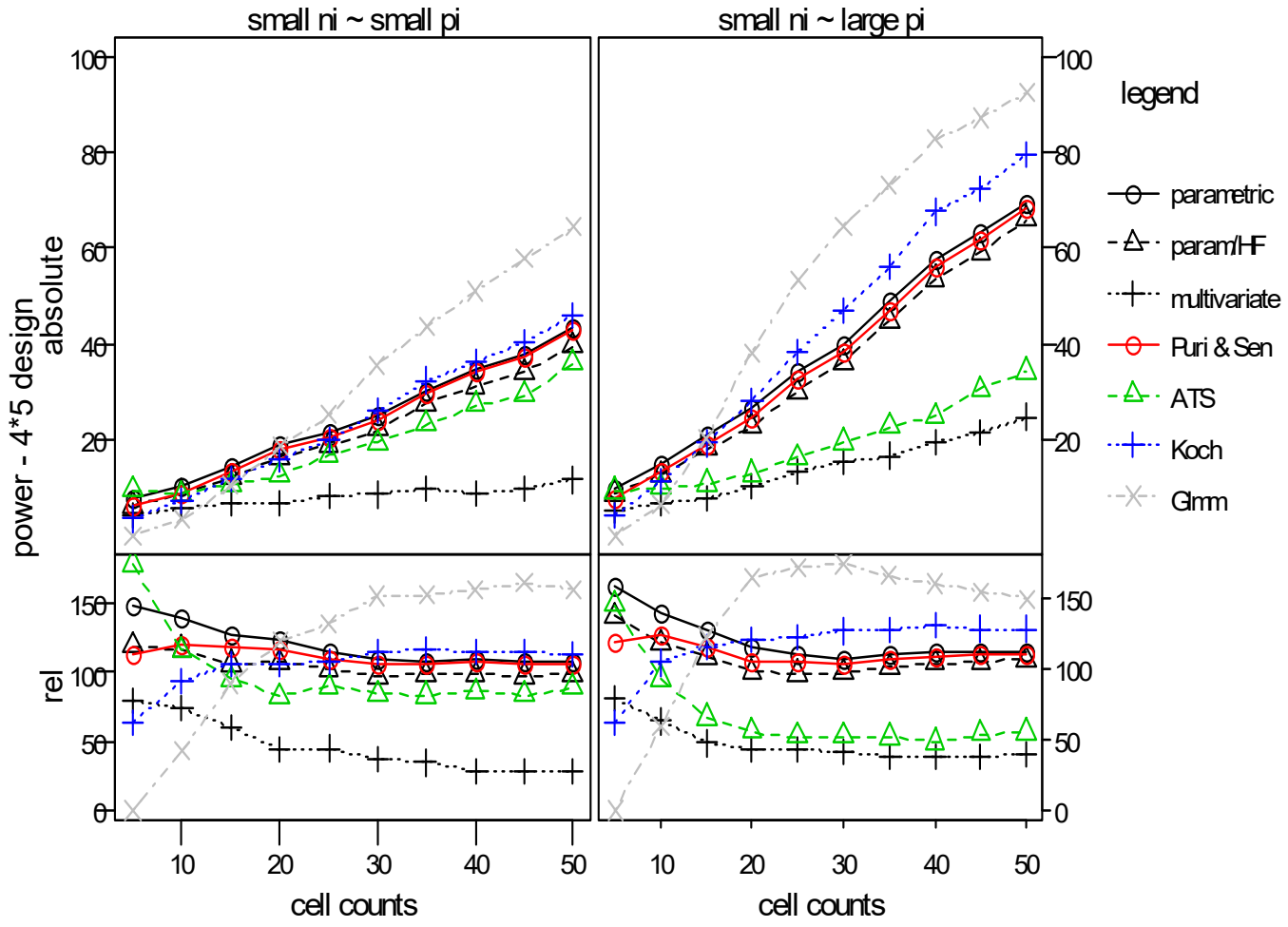
		unequal cell counts small n_i ~ small p_i							unequal cell counts small n_i ~ large p_i						
design	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
4*5	parametric	18.50	22.85	27.95	34.60	48.15	60.95	72.25	5.50	9.35	13.95	22.70	40.45	58.20	71.60
	par./ HF-corr.	13.50	19.55	24.60	31.90	45.45	58.65	69.95	4.20	8.20	12.50	21.35	38.75	56.10	70.60
	multivariate	4.10	8.60	11.75	11.95	15.50	17.45	19.35	1.20	2.95	3.85	5.20	9.20	12.70	17.65
	Puri & Sen	16.20	21.10	26.30	33.30	47.25	60.15	71.05	4.15	7.65	12.30	21.20	38.35	56.55	70.50
	ATS	4.75	4.55	7.70	10.90	20.75	30.70	41.15	3.35	5.40	10.20	16.00	33.05	51.65	66.95
	Koch	9.55	15.55	23.65	29.75	43.75	57.85	68.85	2.40	3.95	8.25	15.65	33.75	52.35	68.90
	GLMM	0.10	0.00	0.00	0.10	2.50	8.80	21.40	0.10	0.10	0.10	0.50	3.50	13.41	23.32


small ni ~ small pi
small ni ~ large pi
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 5. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

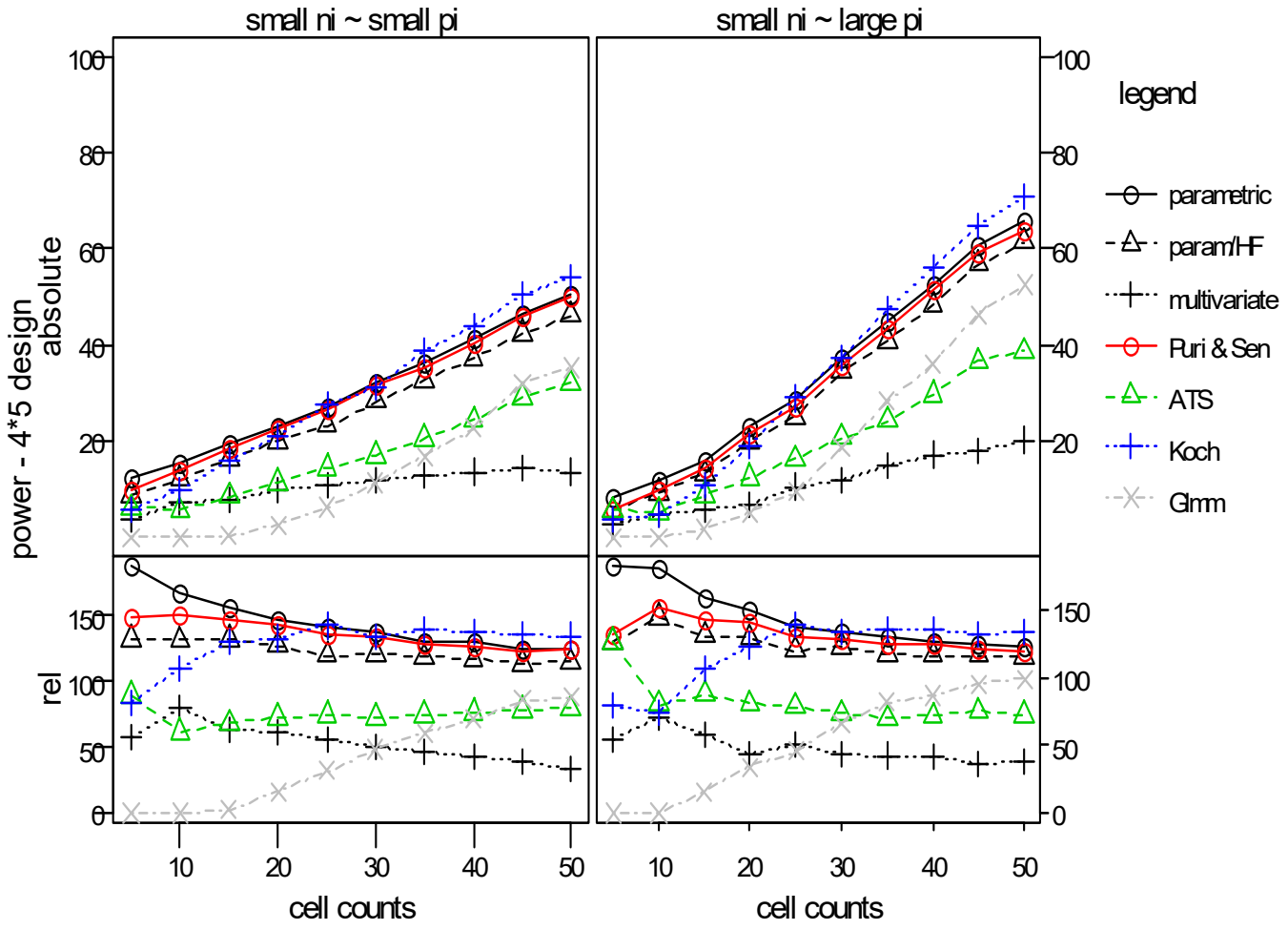
4. 5. 2. 1 p = 0.5

		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	7.90	10.45	14.40	18.70	25.15	34.65	43.15	10.00	14.90	21.05	26.60	39.65	57.45	69.50
	par./ HF-corr.	6.30	8.70	12.00	16.25	22.20	31.20	39.50	8.70	12.60	18.10	22.65	36.05	53.60	65.95
	multivariate	4.20	5.50	6.70	6.75	8.50	8.90	11.55	5.00	6.70	7.85	10.10	15.35	19.35	24.75
	Puri & Sen	6.00	8.90	13.35	17.70	24.15	33.95	42.80	7.50	13.15	19.10	24.35	38.45	56.25	68.40
	ATS	9.45	8.65	10.70	12.50	19.25	27.25	35.85	9.20	9.95	10.90	12.90	19.40	24.95	34.20
	Koch	3.40	7.00	11.95	16.10	26.20	36.20	45.75	3.95	11.10	19.20	27.90	47.05	67.50	79.45
	GLMM	0.00	3.20	10.40	18.60	35.60	50.90	64.40	0.00	6.30	20.30	38.10	64.60	82.70	92.40


small ni ~ small pi
small ni ~ large pi
power - 4*5 design absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

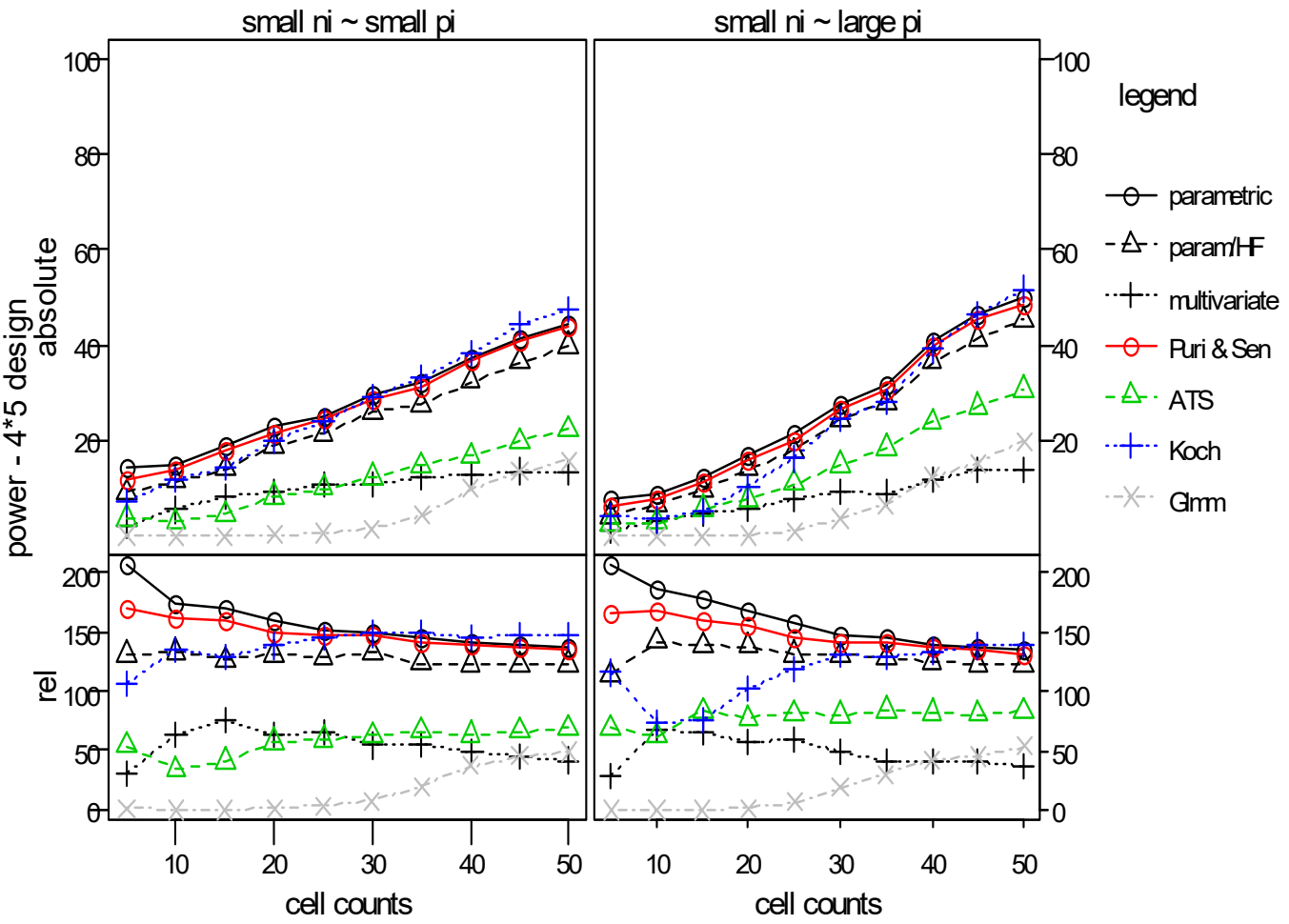
4. 5. 2. 2 p = 0.8

		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	12.45	15.15	19.40	23.05	32.15	41.30	50.25	8.05	11.60	16.10	22.80	37.40	52.65	65.75
	par./ HF-corr.	8.75	11.95	16.30	19.95	28.30	37.10	46.05	5.60	9.30	13.25	19.75	34.35	48.35	61.35
	multivariate	3.85	7.25	7.75	9.65	11.85	13.55	13.55	2.40	4.50	5.90	6.65	11.95	17.10	20.15
	Puri & Sen	9.90	13.70	18.15	22.40	31.45	40.40	49.70	5.80	9.75	14.50	21.50	35.85	51.40	63.50
	ATS	5.95	5.60	8.45	11.35	17.00	24.30	31.90	5.60	5.15	8.85	12.30	20.60	29.60	38.50
	Koch	5.50	9.95	16.05	20.85	31.30	44.00	54.05	3.50	4.80	10.80	18.85	37.35	56.10	70.95
	GLMM	0.00	0.00	0.30	2.50	11.30	22.70	35.20	0.00	0.00	1.60	5.10	18.60	36.00	52.50


small ni ~ small pi
small ni ~ large pi
power - 4*5 design
absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm

4. 5. 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	14.15	15.00	18.90	22.95	29.45	37.45	44.35	7.50	8.55	12.30	17.05	27.75	40.70	49.85
	par./ HF-corr.	9.00	11.45	14.05	18.95	25.95	32.35	39.75	4.15	6.50	9.60	14.00	24.45	36.35	45.15
	multivariate	2.05	5.45	8.35	9.15	10.65	13.00	13.50	1.05	3.10	4.55	5.85	9.10	11.70	13.70
	Puri & Sen	11.70	13.90	17.70	21.70	28.75	36.75	43.75	6.00	7.65	11.10	15.85	26.50	39.80	48.20
	ATS	3.70	2.95	4.55	8.30	12.30	16.80	22.25	2.50	2.85	5.75	7.85	14.95	23.90	30.70
	Koch	7.30	11.60	14.25	19.95	29.15	38.40	47.35	4.20	3.40	5.25	10.30	24.60	39.00	51.70
	GLMM	0.10	0.00	0.00	0.20	1.40	9.90	15.80	0.00	0.00	0.00	0.10	3.60	12.30	19.80


small ni ~ small pi
small ni ~ large pi
power - 4*5 design absolute
rel
cell counts
cell counts
legend
parametric
param/HF
multivariate
Puri & Sen
ATS
Koch
Glmm