ANOVA with binary variables - Alternatives for a sometimes dangerous F-test

Appendix B 8
Tables and Graphs of the Power of all considered 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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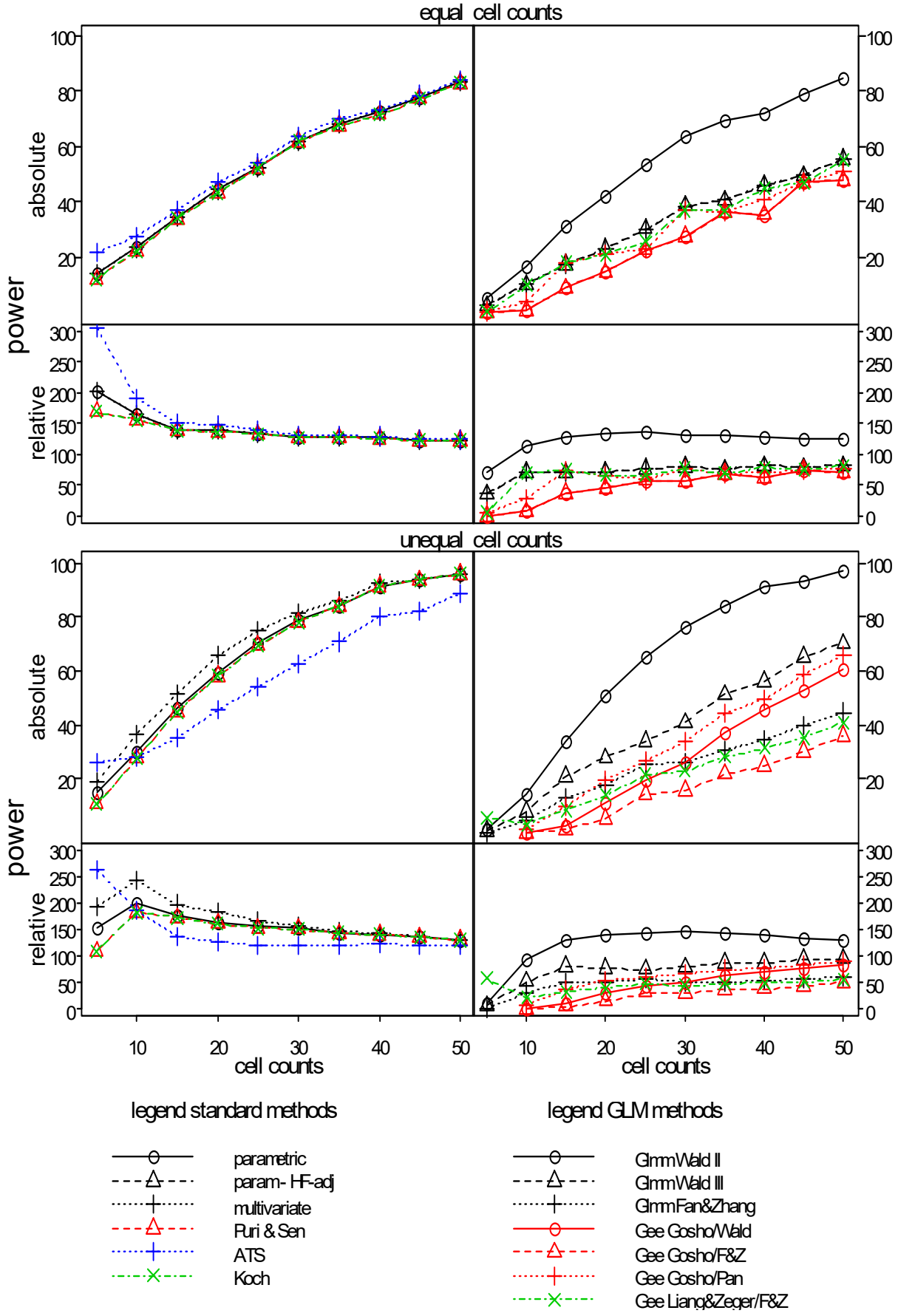
8. 1. Main effect A (effects a_i = 0.4*s)

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

8. 1. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	14.25	23.40	34.50	44.40	62.15	72.55	83.25	15.10	30.10	46.30	59.35	78.65	91.45	96.00
	par./ HF-corr.														
	multivariate	14.25	23.40	34.50	44.40	62.15	72.55	83.25	18.90	36.70	51.45	65.85	81.50	92.25	95.95
	Puri & Sen	11.95	22.25	33.95	43.35	61.80	71.60	82.95	10.75	27.60	44.75	58.10	78.10	91.25	95.85
	ATS	21.55	27.25	37.15	47.05	63.85	73.45	83.95	25.80	28.15	35.45	45.40	62.65	80.00	88.65
	Koch	11.95	22.25	33.95	43.35	61.80	71.60	82.95	10.75	27.60	44.75	58.10	78.10	91.25	95.85
	Glmm Wald II	5.0	16.4	31.6	42.2	64.0	72.1	84.6	1.0	14.2	33.9	50.7	76.5	90.9	96.8
	Glmm Wald III	2.5	10.2	17.3	23.0	38.6	46.0	55.5	0.6	7.8	20.8	27.9	40.8	56.1	70.1
	Glmm Fan&Zhang	2.5	10.2	17.3	23.0	38.6	46.0	55.5	0.0	4.8	12.9	17.6	26.1	34.3	44.6
	Gee Gosho/Wald	0.0	1.0	9	14.6	27.7	35.4	47.9		0.1	2.6	10.9	25.8	45.6	60.4
	Gee Gosho/F&Z	0.0	1.0	9	14.6	27.7	35.4	47.9		0.1	1.3	5.3	15.7	24.7	35.8
	Gee Gosho/Pan	0.5	3.9	18	20.9	37.1	40.7	51.3		1.2	9.7	19.5	33.9	49.5	65.6
	Gee Liang&Zeger	0.4	10.0	18	21.0	37.1	44.9	55.1	5.6	3.2	8.4	13.9	23.1	31.5	40.8
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	5.20	9.15	15.9	21.8	36.95	50.30	63.35	4.60	11.65	23.7	35.00	57.15	77.60	87.60
	par./ HF-corr.														
	multivariate	5.20	9.15	15.9	21.8	36.95	50.30	63.35	6.45	15.90	29.2	40.95	60.15	79.55	86.70
	Puri & Sen	2.45	7.40	13.7	19.4	35.55	49.00	62.35	1.25	8.70	20.8	32.90	54.90	76.60	87.05
	ATS	10.60	13.70	19.9	25.1	40.20	52.35	65.10	15.35	15.95	19.2	23.45	37.95	55.85	69.30
	Koch	2.45	7.40	13.7	19.4	35.55	49.00	62.35	1.25	8.70	20.8	32.90	54.90	76.60	87.05
	Glmm Wald II	0.6	4.8	11.3	19.8	37.5	50.4	65.7	0.2	4.6	16.0	27.3	52.8	77.0	87.9
	Glmm Wald III	0.6	1.7	3.5	7.6	15.0	21.9	33.2	0.2	1.4	6.4	11.4	19.0	33.6	45.3
	Glmm Fan&Zhang	0.6	1.7	3.5	7.6	15.0	21.9	33.2	0.0	0.7	3.7	5.6	9.3	14.5	22.3
	Gee Gosho/Wald	0.0	0.0	1.2	3.2	11.9	14.5	26.0		0.1	0.1	1.5	8.2	20.3	31.2
	Gee Gosho/F&Z	0.0	0.0	1.2	3.2	11.9	14.5	26.0		0.1	0.1	0.5	2.8	8.9	14.6
	Gee Gosho/Pan	0.5	0.1	1.3	6.4	11.9	17.3	26.1		0.1	0.7	4.0	11.6	24.0	34.8
	Gee Liang&Zeger	0.4	1.0	3.9	6.4	12.2	20.3	29.3	5.6	0.2	0.8	2.7	7.3	11.9	19.0

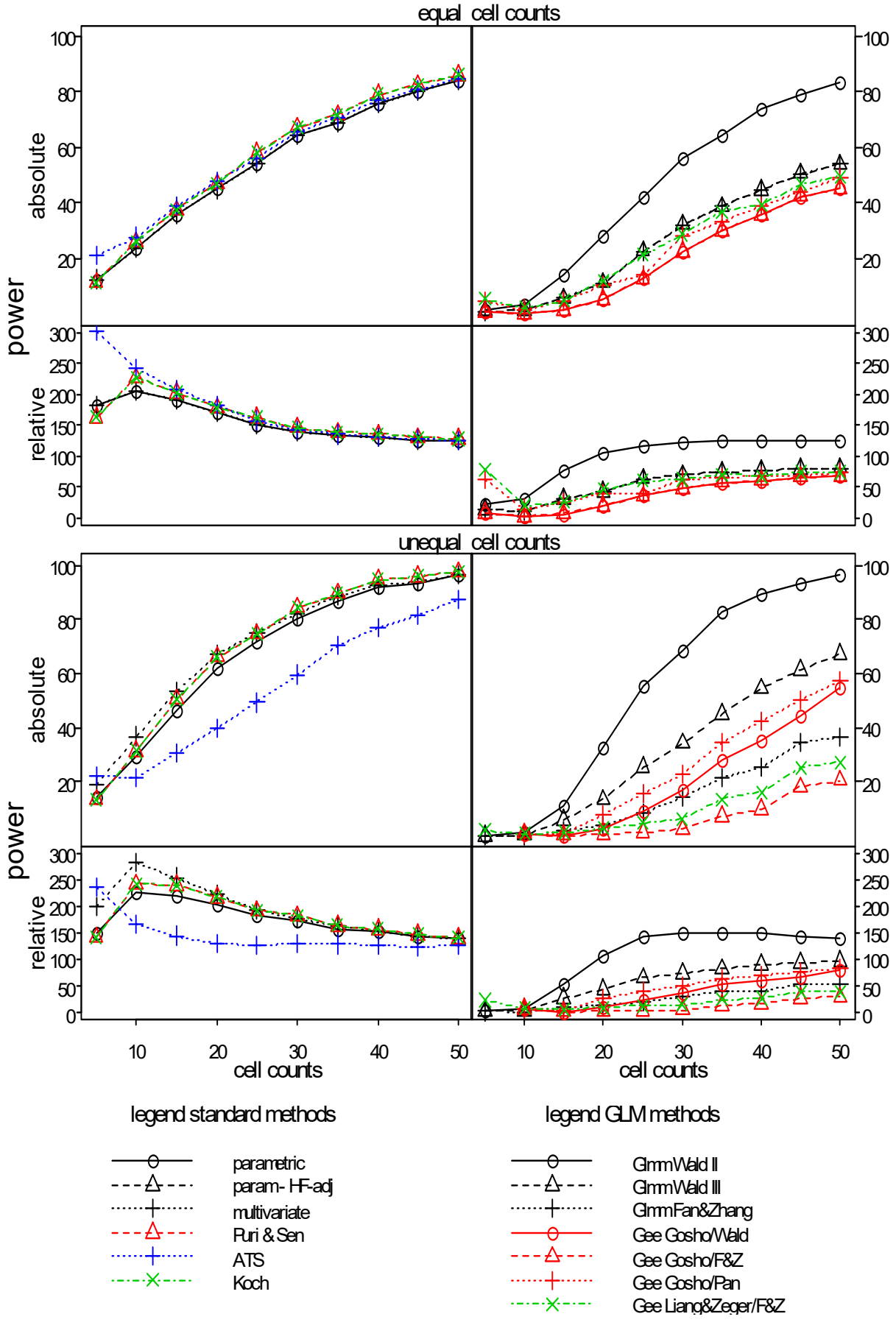
Graphic for α=0.05:



8. 1. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	12.55	23.55	35.7	45.00	64.5	76.05	84.15	14.15	29.25	46.40	61.80	80.45	91.7	96.20
	par./ HF-corr.														
	multivariate	12.55	23.55	35.7	45.00	64.5	76.05	84.15	18.85	36.80	53.60	67.35	81.80	92.6	96.60
	Puri & Sen	11.30	25.95	37.6	47.05	67.2	79.15	86.15	13.30	31.30	50.45	66.10	84.35	94.7	97.60
	ATS	20.90	27.80	38.8	47.70	65.8	76.80	84.60	22.15	21.45	30.50	39.70	59.60	77.0	87.15
	Koch	11.30	25.95	37.6	47.05	67.2	79.15	86.15	13.30	31.30	50.45	66.10	84.35	94.7	97.60
	Glmm Wald II	1.6	3.5	14.3	28.0	56.4	73.7	83.5	0.2	1.1	11.3	32.6	68.6	89.5	96.4
	Glmm Wald III	1.0	1.2	5.8	11.2	32.3	44.7	54.0	0.2	0.3	5.8	13.4	34.2	54.5	67.2
	Glmm Fan&Zhang	1.0	1.2	5.8	11.2	32.3	44.7	54.0	0.2	0.2	1.8	3.8	14.2	25.2	36.3
	Gee Gosho/Wald	0.6	0.1	1.2	5.2	22.5	35.5	45.4		1.0	0.3	2.9	17.3	35.4	54.5
	Gee Gosho/F&Z	0.5	0.1	1.3	5.2	22.5	35.5	45.4		1.0	0.3	0.7	2.3	9.8	20.4
	Gee Gosho/Pan	4.3	1.7	4.8	10.6	28.3	38.9	48.8		1.0	0.8	8.1	22.6	42.4	57.4
	Gee Liang&Zeger	5.4	2.4	4.8	12.0	28.8	39.4	49.5	2.2	1.0	1.4	2.9	6.4	16.1	27.1
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	2.65	6.85	14.30	21.55	38.00	52.8	63.90	4.9	10.15	23.60	36.75	58.30	77.05	87.85
	par./ HF-corr.														
	multivariate	2.65	6.85	14.30	21.55	38.00	52.8	63.90	5.8	15.35	29.50	41.80	61.95	78.10	88.00
	Puri & Sen	1.05	6.60	15.60	23.75	42.25	55.7	68.55	2.2	11.55	25.75	40.60	65.10	83.55	91.65
	ATS	8.05	12.20	18.45	25.00	40.85	54.7	65.90	12.6	9.50	13.45	16.35	29.60	46.20	63.50
	Koch	1.05	6.60	15.60	23.75	42.25	55.7	68.55	2.2	11.55	25.75	40.60	65.10	83.55	91.65
	Glmm Wald II	0.8	0.4	3.1	8.1	27.2	45.4	61.1	0.2	0.3	3.4	10.9	42.5	71.1	87.5
	Glmm Wald III	0.7	0.3	0.9	0.9	7.7	15.8	27.8	0.2	0.2	0.6	2.1	10.5	25.4	41.9
	Glmm Fan&Zhang	0.7	0.3	0.9	0.9	7.7	15.8	27.8	0.2	0.2	0.6	0.6	1.3	5.2	12.3
	Gee Gosho/Wald	0.6	0.1	0.1	0.3	2.4	9.9	18.9		1.0	0.3	0.1	2.3	10.3	24.4
	Gee Gosho/F&Z	0.5	0.1	0.1	0.3	2.4	9.9	18.9		1.0	0.3	0.1	0.1	0.3	2.4
	Gee Gosho/Pan	4.3	1.4	0.6	0.7	3.9	10.6	20.3		1.0	0.3	0.5	4.2	14.2	27.7
	Gee Liang&Zeger	5.4	1.1	0.9	1.0	4.8	13.8	21.9	2.2	1.0	0.8	0.4	0.5	0.8	4.2

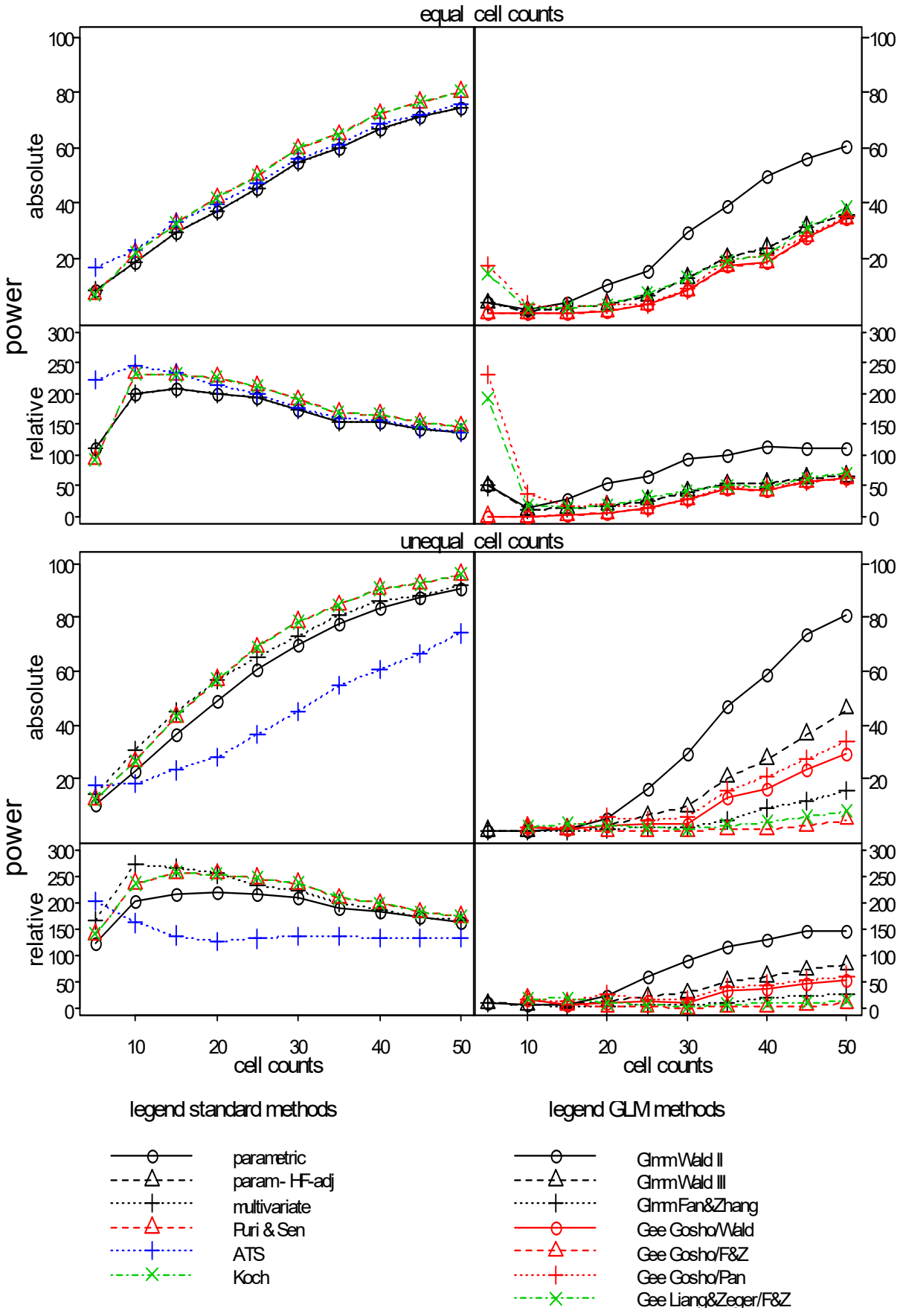
Graphic for α=0.05:



8. 1. 1. 3 p = 0.9

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	8.25	18.85	29.25	36.85	54.60	67.00	74.75	10.70	22.80	36.20	48.85	69.60	83.15	90.30
	par./ HF-corr.														
	multivariate	8.25	18.85	29.25	36.85	54.60	67.00	74.75	14.60	30.85	44.70	56.70	73.15	85.90	92.00
	Puri & Sen	6.95	22.00	32.65	41.90	59.85	72.45	80.40	12.35	26.60	43.15	56.65	78.15	90.60	95.95
	ATS	16.75	23.35	33.10	39.65	55.90	68.80	75.70	17.80	18.20	23.15	27.95	45.00	60.75	74.00
	Koch	6.95	22.00	32.65	41.90	59.85	72.45	80.40	12.35	26.60	43.15	56.65	78.15	90.60	95.95
	Glmm Wald II	3.8	1.4	4.0	10.1	29.6	49.7	60.7	0.8	0.7	1.4	5.5	29.2	59.0	80.5
	Glmm Wald III	3.7	1.0	1.9	3.3	12.9	23.6	36.0	0.8	0.6	1.4	2.9	9.7	27.5	45.9
	Glmm Fan&Zhang	3.7	1.0	1.9	3.3	12.9	23.6	36.0	0.8	0.6	0.7	1.1	2.2	9.0	15.4
	Gee Gosho/Wald	0.0	0.0	0.2	0.9	8.5	18.4	34.3		2.0	1.1	2.3	3.5	16.5	29.4
	Gee Gosho/F&Z	0.0	0.0	0.2	0.9	8.5	18.4	34.3		2.0	1.1	0.6	0.3	1.2	4.8
	Gee Gosho/Pan	17.2	3.4	2.4	3.5	8.8	21.0	35.0		2.0	2.2	5.8	5.6	20.6	34.2
	Gee Liang&Zeger	14.4	1.8	2.1	3.1	13.1	21.1	38.3		2.0	3.3	2.3	1.0	4.0	8.1
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	1.65	4.00	9.20	15.0	28.75	41.05	52.40	3.75	7.25	15.50	25.20	44.35	62.25	75.15
	par./ HF-corr.														
	multivariate	1.65	4.00	9.20	15.0	28.75	41.05	52.40	3.85	10.05	19.90	31.45	49.10	65.50	77.00
	Puri & Sen	0.60	4.85	10.45	18.0	33.45	46.85	59.85	1.65	8.10	19.85	31.20	53.90	73.30	85.20
	ATS	4.65	8.30	12.65	18.3	31.50	44.20	54.15	8.55	6.00	8.75	9.50	16.80	26.90	40.80
	Koch	0.60	4.85	10.45	18.0	33.45	46.85	59.85	1.65	8.10	19.85	31.20	53.90	73.30	85.20
	Glmm Wald II	3.7	1.0	1.1	2.0	9.2	20.5	33.0	0.8	0.6	0.7	1.4	10.9	32.8	56.6
	Glmm Wald III	3.7	1.0	1.0	0.8	2.3	4.1	9.3	0.8	0.6	0.6	0.8	1.9	7.9	16.7
	Glmm Fan&Zhang	3.7	1.0	1.0	0.8	2.3	4.1	9.3	0.8	0.6	0.6	0.9	0.8	1.2	2.2
	Gee Gosho/Wald	0.0	0.0	0.0	0.0	0.0	0.7	4.6		2.0	1.1	0.6	0.3	2.7	6.5
	Gee Gosho/F&Z	0.0	0.0	0.0	0.0	0.0	0.7	4.6		2.0	1.1	0.6	0.3	0.2	0.1
	Gee Gosho/Pan	17.2	2.7	0.8	0.8	0.1	0.7	5.4		2.0	1.1	0.6	0.3	4.2	8.3
	Gee Liang&Zeger	14.4	1.8	0.4	0.4	0.6	2.8	6.1		2.0	3.3	2.3	1.0	0.6	0.1

Graphic for α=0.05:

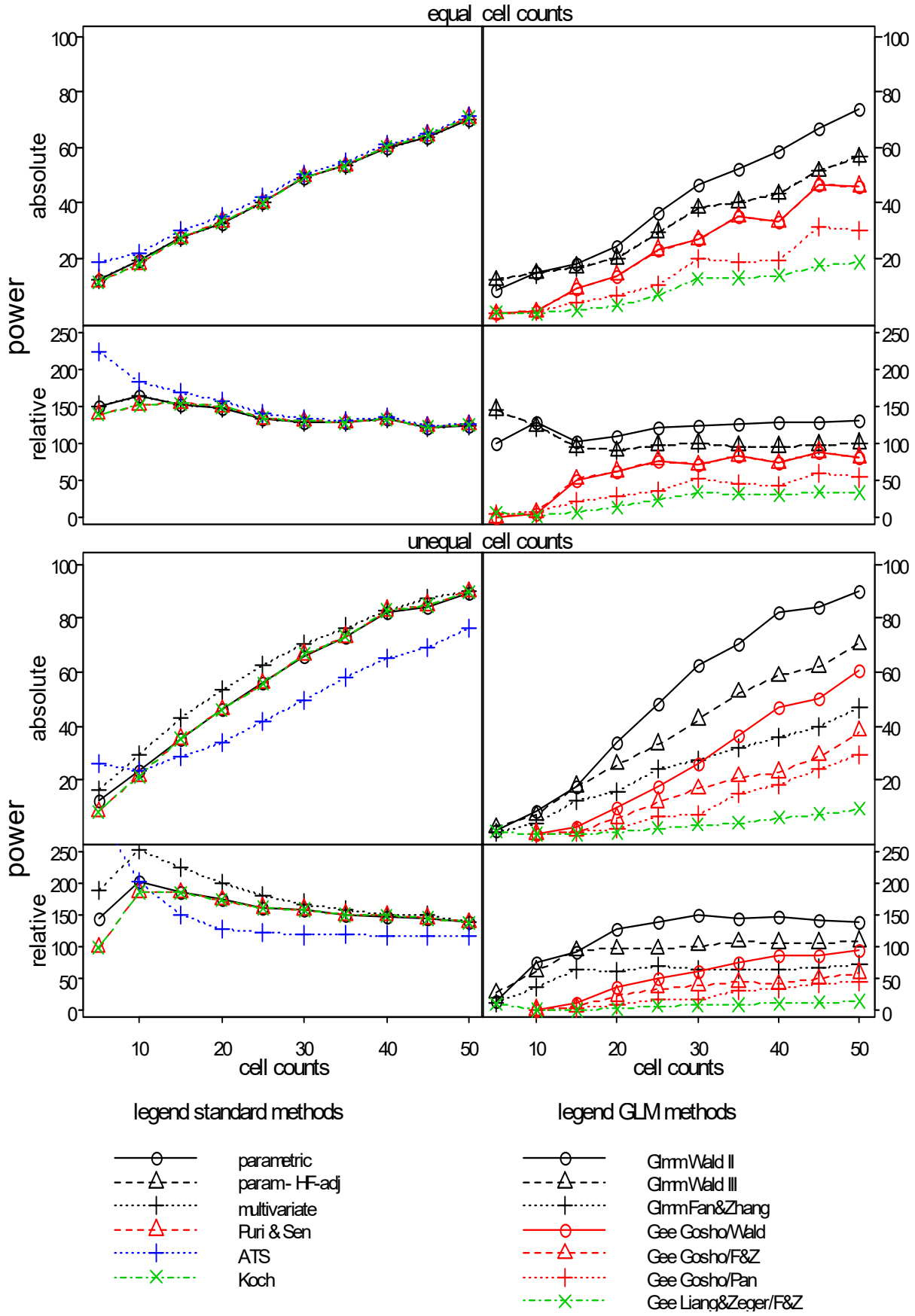


8. 1. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

8. 1. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	12.55	19.35	27.30	32.8	49.15	60.2	70.05	12.25	23.25	35.35	46.40	66.05	81.80	89.25
	par./ HF-corr.														
	multivariate	12.55	19.35	27.30	32.8	49.15	60.2	70.05	16.00	29.15	42.75	53.10	70.50	83.05	90.05
	Puri & Sen	11.55	17.95	27.40	33.2	49.40	60.4	70.75	8.35	21.40	35.20	46.05	66.55	82.80	89.65
	ATS	18.55	21.65	30.05	35.1	50.65	61.3	71.20	26.30	23.20	28.55	33.85	49.60	65.35	76.35
	Koch	11.55	17.95	27.40	33.2	49.40	60.4	70.75	8.35	21.40	35.20	46.05	66.55	82.80	89.65
	Glmm Wald II	8.3	15.1	18.1	24.2	46.7	58.6	73.7	1.3	8.6	17.5	33.8	62.7	81.9	90.2
	Glmm Wald III	12.1	14.5	16.8	20.0	38.1	43.3	56.6	2.3	7.1	17.7	25.7	42.5	58.5	70.2
	Glmm Fan&Zhang	12.1	14.5	16.8	20.0	38.1	43.3	56.6	0.9	4.1	12.4	15.9	27.2	35.9	46.6
	Gee Gosho/Wald	0.0	0.6	9.0	13.8	26.7	33.3	45.9		0.0	2.3	9.8	26.0	47.1	60.4
	Gee Gosho/F&Z	0.0	0.7	9.1	13.8	26.7	33.3	45.9		0.0	0.9	6.0	16.6	22.8	38.1
	Gee Gosho/Pan	0.3	0.7	3.8	6.4	19.7	19.3	30.2		0.0	0.5	2.1	7.2	18.4	29.5
	Gee Liang&Zeger	0.5	0.1	1.2	3.0	12.8	13.6	18.6	0.9	0.0	0.0	0.6	3.4	6.0	9.2
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	4.60	7.25	11.40	15.05	25.70	35.6	46.40	3.40	9.30	17.10	23.80	41.95	61.00	73.65
	par./ HF-corr.														
	multivariate	4.60	7.25	11.40	15.05	25.70	35.6	46.40	5.30	11.95	20.85	28.55	46.50	64.15	74.55
	Puri & Sen	1.70	5.35	9.65	12.95	25.05	35.4	45.75	0.95	6.65	15.10	22.05	40.30	61.00	73.70
	ATS	10.05	11.05	15.25	17.40	27.95	38.5	48.20	13.60	13.40	15.30	16.45	26.65	38.55	52.15
	Koch	1.70	5.35	9.65	12.95	25.05	35.4	45.75	0.95	6.65	15.10	22.05	40.30	61.00	73.70
	Glmm Wald II	2.6	8.6	7.2	8.2	19.4	31.6	46.9	0.1	2.6	6.0	12.0	34.1	59.9	75.0
	Glmm Wald III	2.7	8.3	6.3	6.7	13.0	19.8	30.2	0.9	1.4	3.9	7.8	18.1	32.5	45.0
	Glmm Fan&Zhang	2.7	8.3	6.3	6.7	13.0	19.8	30.2	0.1	0.2	2.5	4.8	11.3	15.4	24.1
	Gee Gosho/Wald	0.0	0.0	1.1	3.0	12.8	13.7	24.1		0.0	0.1	1.0	6.5	19.2	32.5
	Gee Gosho/F&Z	0.0	0.0	1.1	3.0	12.8	13.7	24.1		0.0	0.0	0.4	4.6	9.1	14.3
	Gee Gosho/Pan	0.3	0.1	0.0	1.3	5.0	6.3	12.5		0.0	0.0	0.2	0.8	4.7	10.7
	Gee Liang&Zeger	0.5	0.1	0.0	0.1	1.3	2.4	3.4	0.9	0.0	0.0	0.0	0.2	0.5	0.8

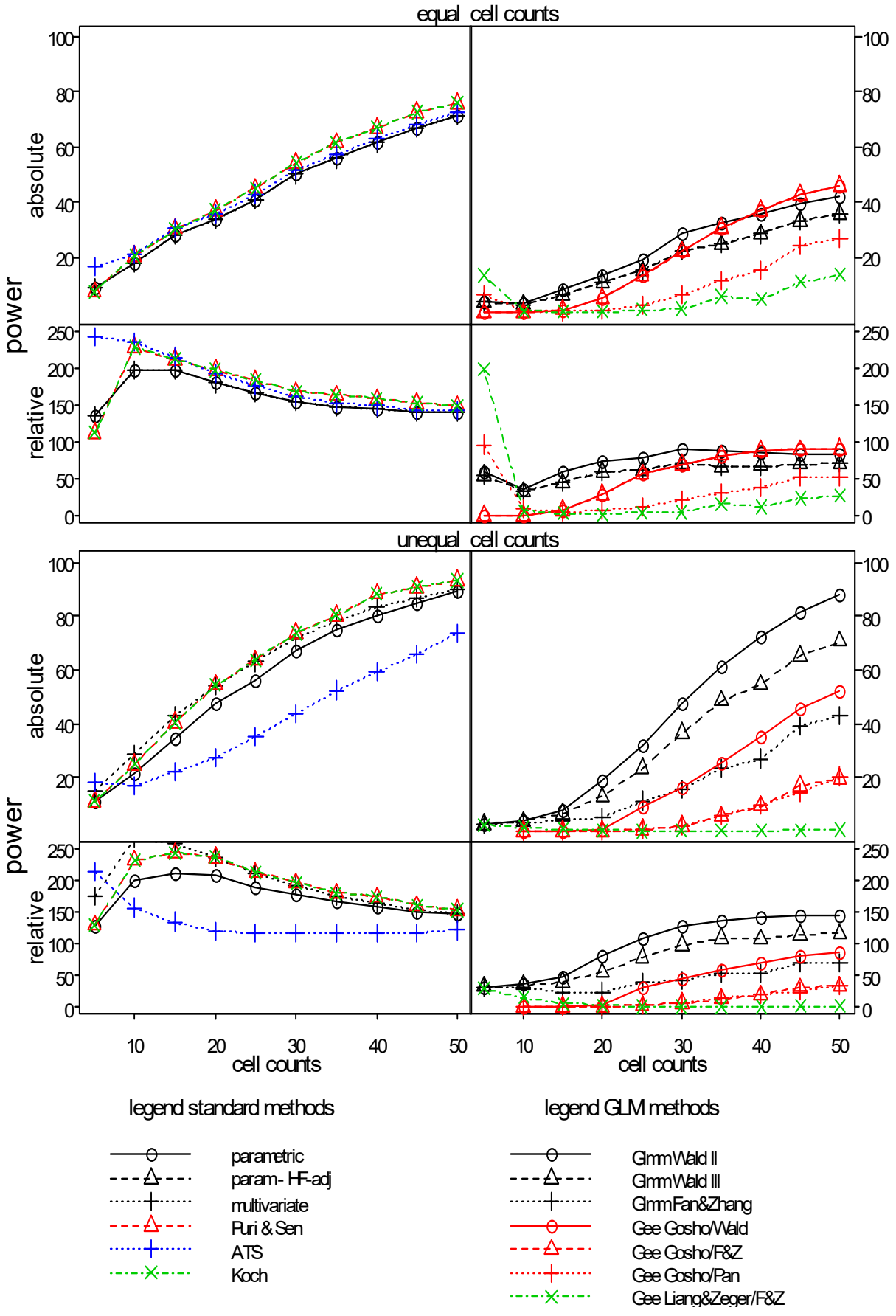
Graphic for α=0.05:



8. 1. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	9.30	17.80	28.15	33.70	50.10	61.55	71.15	11.10	21.60	34.80	47.80	66.90	80.25	89.5
	par./ HF-corr.														
	multivariate	9.30	17.80	28.15	33.70	50.10	61.55	71.15	15.10	28.55	42.80	54.10	71.35	83.30	90.1
	Puri & Sen	7.65	20.55	30.35	37.05	54.25	67.10	76.00	11.25	24.85	40.35	54.35	73.60	88.15	93.1
	ATS	16.50	21.15	30.80	36.00	51.85	62.85	72.40	18.45	16.85	22.30	27.60	43.85	59.35	73.8
	Koch	7.65	20.55	30.35	37.05	54.25	67.10	76.00	11.25	24.85	40.35	54.35	73.60	88.15	93.1
	Glmm Wald II	4.1	3.1	8.6	13.7	28.9	36.0	42.3	2.8	3.8	7.7	18.8	47.8	72.2	87.7
	Glmm Wald III	3.7	2.9	6.3	11.1	22.6	28.5	35.9	2.8	3.7	6.6	12.7	36.4	54.5	70.6
	Glmm Fan&Zhang	3.7	2.9	6.3	11.1	22.6	28.5	35.9	2.8	3.4	3.6	5.4	15.7	27.0	42.8
	Gee Gosho/Wald	0.0	0.0	1.0	5.4	22.2	37.2	46.1		0.0	0.0	0.9	16.4	35.1	51.9
	Gee Gosho/F&Z	0.0	0.0	1.1	5.3	22.2	37.2	46.1		0.0	0.0	0.0	2.1	9.5	19.7
	Gee Gosho/Pan	6.6	0.9	0.5	1.1	6.5	15.5	26.7		0.0	0.0	0.0	1.9	10.0	20.5
	Gee Liang&Zeger	13.5	0.5	0.4	0.3	1.4	4.9	13.7	2.5	1.6	0.8	0.5	0.1	0.2	0.6
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	1.50	4.30	9.50	13.90	26.00	36.20	46.85	3.75	6.65	14.85	23.65	40.55	58.6	73.75
	par./ HF-corr.														
	multivariate	1.50	4.30	9.50	13.90	26.00	36.20	46.85	3.90	10.45	19.90	29.90	47.00	62.9	75.80
	Puri & Sen	0.60	4.35	10.35	16.05	28.65	42.05	53.65	2.00	7.45	17.30	28.35	49.40	69.6	81.30
	ATS	6.15	8.55	13.10	16.65	28.90	39.00	48.75	10.00	6.25	8.75	10.30	17.50	27.7	40.35
	Koch	0.60	4.35	10.35	16.05	28.65	42.05	53.65	2.00	7.45	17.30	28.35	49.40	69.6	81.30
	Glmm Wald II	3.3	1.5	2.4	2.9	12.3	19.9	29.1	2.8	3.1	3.8	6.3	20.3	44.4	68.6
	Glmm Wald III	3.1	1.9	2.0	1.5	5.6	11.9	16.9	2.8	3.0	3.4	3.6	11.8	27.5	44.9
	Glmm Fan&Zhang	3.1	1.9	2.0	1.5	5.6	11.9	16.9	2.8	3.0	2.9	3.1	4.5	8.7	14.9
	Gee Gosho/Wald	0.0	0.0	0.0	0.2	1.4	8.5	17.3		0.0	0.0	0.0	2.0	10.7	24.7
	Gee Gosho/F&Z	0.0	0.0	0.0	0.2	1.4	8.5	17.3		0.0	0.0	0.0	0.0	0.3	2.1
	Gee Gosho/Pan	6.3	0.6	0.2	0.2	0.2	1.3	5.6		0.0	0.0	0.0	0.1	0.8	4.4
	Gee Liang&Zeger	13.5	0.4	0.3	0.1	0.0	0.0	0.9	2.5	1.6	0.8	0.2	0.1	0.0	0.0

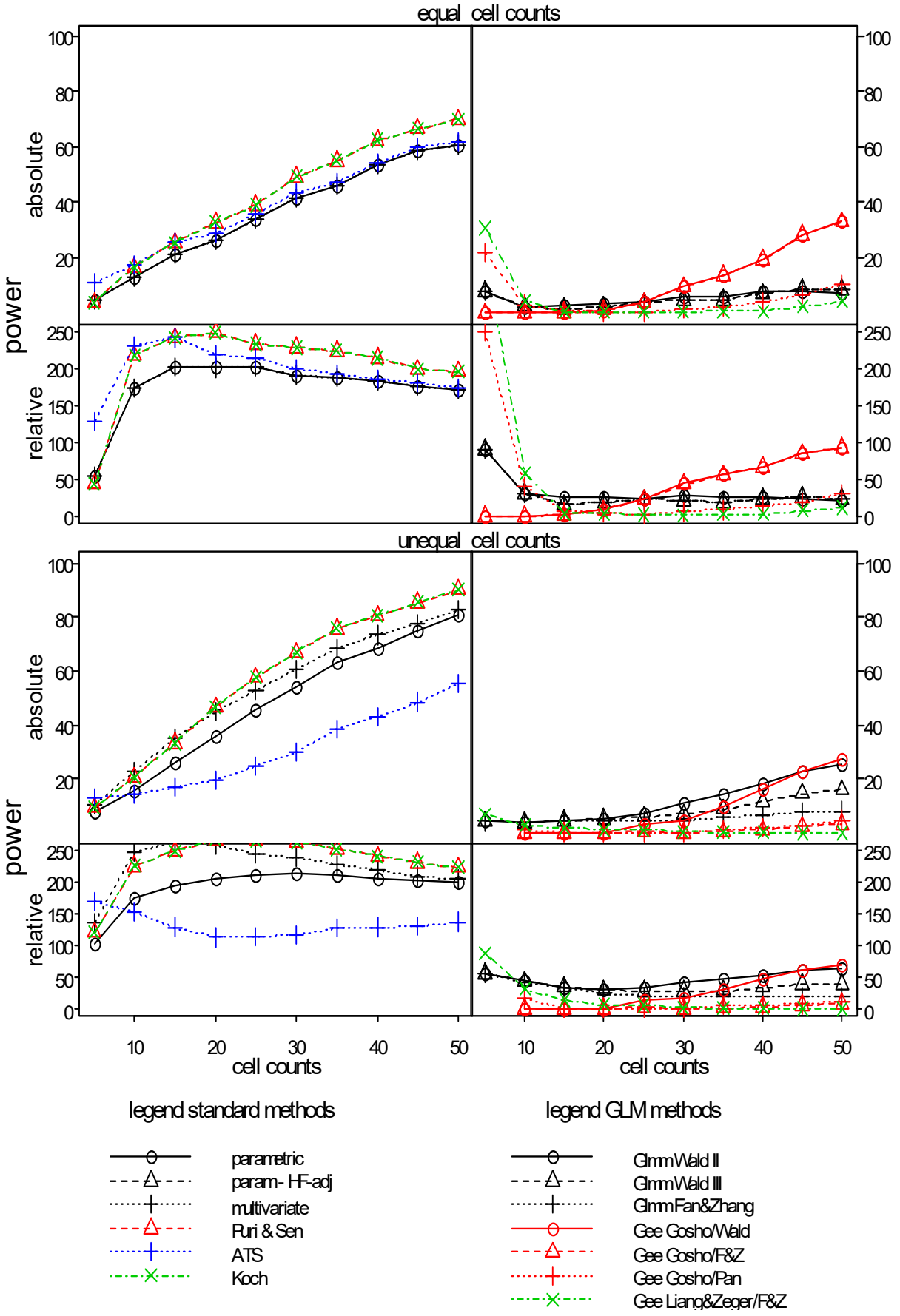
Graphic for α=0.05:



8. 1. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	4.75	13.1	21.4	26.5	41.25	53.35	60.85	7.95	15.95	25.9	36.05	54.30	68.65	80.95
	par./ HF-corr.														
	multivariate	4.75	13.1	21.4	26.5	41.25	53.35	60.85	10.60	22.60	35.3	45.20	60.65	73.30	82.85
	Puri & Sen	3.75	16.5	25.5	32.7	49.25	62.50	69.80	9.40	20.70	33.2	46.70	66.95	80.55	90.15
	ATS	11.15	17.5	25.5	28.9	43.10	54.15	61.95	13.20	14.10	17.2	19.70	29.95	43.10	55.40
	Koch	3.75	16.5	25.5	32.7	49.25	62.50	69.80	9.40	20.70	33.2	46.70	66.95	80.55	90.15
	Glmm Wald II	7.8	2.3	2.8	3.3	5.9	7.6	7.2	4.3	4.1	4.4	5.4	10.9	18.0	25.7
	Glmm Wald III	7.8	2.3	1.6	2.3	4.4	6.9	8.5	4.4	4.1	4.6	5.3	7.1	11.6	16.0
	Glmm Fan&Zhang	7.8	2.3	1.6	2.3	4.4	6.9	8.5	4.3	4.0	4.5	4.3	4.7	6.7	8.1
	Gee Gosho/Wald	0.0	0.0	0.1	1.1	9.5	19.3	32.9		0.0	0.0	0.0	4.3	16.1	27.5
	Gee Gosho/F&Z	0.0	0.0	0.1	1.1	9.4	19.3	32.9		0.0	0.0	0.0	0.0	1.0	3.4
	Gee Gosho/Pan	21.6	3.0	0.8	0.5	1.2	4.2	10.5		1.4	0.0	0.0	0.0	2.0	4.9
	Gee Liang&Zeger	30.7	4.5	0.4	0.5	0.3	0.7	4.1	6.9	2.9	1.9	1.1	0.5	0.2	0.0
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	0.70	1.80	4.80	8.50	18.90	26.85	34.65	2.9	5.30	10.35	16.10	27.95	43.90	57.25
	par./ HF-corr.														
	multivariate	0.70	1.80	4.80	8.50	18.90	26.85	34.65	2.6	7.55	13.30	21.15	35.30	49.35	61.15
	Puri & Sen	0.25	2.25	7.25	13.25	24.65	34.80	44.30	1.4	6.00	13.60	21.20	40.00	60.55	73.40
	ATS	2.45	4.50	7.65	11.30	22.10	29.20	36.50	5.5	4.10	6.40	7.20	10.80	14.35	22.65
	Koch	0.25	2.25	7.25	13.25	24.65	34.80	44.30	1.4	6.00	13.60	21.20	40.00	60.55	73.40
	Glmm Wald II	7.8	1.7	1.4	1.5	2.7	3.9	4.4	4.3	4.0	4.3	4.1	5.5	8.6	14.9
	Glmm Wald III	7.8	1.7	1.3	1.2	1.2	2.5	2.4	4.3	4.0	4.3	4.2	4.5	5.7	7.5
	Glmm Fan&Zhang	7.8	1.7	1.3	1.2	1.2	2.5	2.4	4.3	4.0	4.2	4.1	4.0	4.3	4.1
	Gee Gosho/Wald	0.0	0.0	0.0	0.0	0.1	1.9	4.7		0.0	0.0	0.0	0.0	2.6	7.3
	Gee Gosho/F&Z	0.0	0.0	0.0	0.0	0.1	1.9	4.7		0.0	0.0	0.0	0.0	0.0	0.0
	Gee Gosho/Pan	21.2	2.8	0.5	0.3	0.3	0.0	0.4		1.4	0.0	0.0	0.0	0.0	0.3
	Gee Liang&Zeger	30.7	4.5	0.4	0.5	0.1	0.0	0.1	6.9	1.4	1.9	1.1	0.5	0.2	0.0

Graphic for α=0.05:



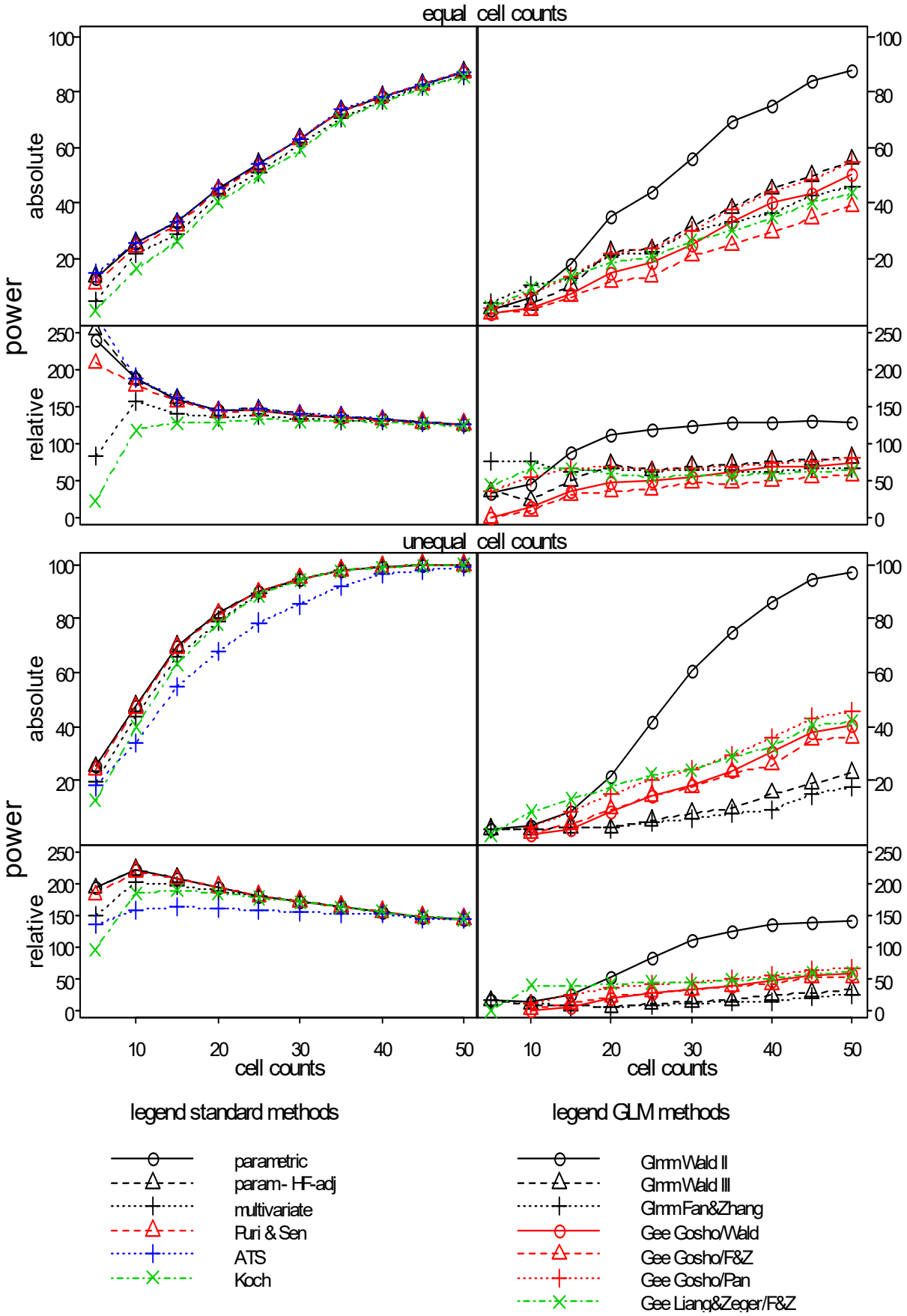
8. 2. Main effect B (effects b_i = 0.3*s)

8. 2. 1. equal correlations (r=0.3)

8. 2. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	12.75	25.60	32.95	45.55	63.15	78.55	87.40	25.25	47.60	69.60	81.80	94.75	99.05	99.75
	par./ HF-corr.	13.50	25.60	32.95	45.25	63.35	78.55	87.40	25.25	47.55	69.70	81.85	94.75	99.05	99.70
	multivariate	4.40	21.55	28.70	42.95	61.10	77.15	86.30	19.65	43.60	65.55	79.15	94.50	98.90	99.70
	Puri & Sen	11.10	24.45	32.15	44.85	62.95	78.25	87.05	23.85	47.05	69.00	81.60	94.75	99.05	99.75
	ATS	14.55	25.90	33.20	45.35	63.35	78.55	87.40	17.95	34.05	54.80	67.60	85.05	96.25	98.90
	Koch	1.20	16.15	26.30	40.30	59.25	76.45	85.85	12.60	39.70	63.20	77.95	94.15	98.90	99.70
	Glmm Wald II	1.7	6.1	17.9	35.4	56.0	75.5	88.2	2.2	3.1	8.7	21.6	60.4	86.1	97.2
	Glmm Wald III	1.8	3.1	10.3	22.6	31.8	45.1	55.8	2.0	2.0	2.8	2.4	7.9	15.2	22.8
	Glmm Fan&Zhang	4.0	10.3	12.6	21.1	29.9	36.1	45.7	2.0	2.2	2.4	2.3	5.8	9.2	17.3
	Gee Gosho/Wald	0.0	1.9	7.5	14.7	24.7	40.2	50.7		0.2	2.1	8.3	18.0	30.5	40.7
	Gee Gosho/F&Z	0.0	1.3	6.1	11.3	21.0	29.4	38.7		0.5	3.9	9.5	17.7	25.6	35.8
	Gee Gosho/Pan	1.8	7.4	13.7	21.9	30.3	44.3	54.9		2.6	8.7	14.8	24.3	35.5	45.5
	Gee Liang&Zeger	2.3	9.2	13.6	18.6	26.2	34.8	43.7	0	8.5	13.0	17.7	24.0	32.6	41.8
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	3.50	9.25	14.30	23.55	39.70	58.45	69.95	9.85	24.30	45.70	62.35	85.00	95.95	99.25
	par./ HF-corr.	4.00	9.35	14.05	24.00	39.20	58.40	70.10	9.90	24.20	45.85	62.10	84.85	95.95	99.25
	multivariate	1.25	5.15	11.05	19.90	35.10	54.35	68.55	4.50	18.45	39.55	57.75	82.70	95.20	98.85
	Puri & Sen	1.85	7.55	12.75	22.00	38.10	57.55	69.55	8.40	23.00	44.85	61.65	84.60	95.95	99.25
	ATS	4.75	9.90	14.55	24.30	39.55	58.75	70.25	6.30	14.55	30.10	43.25	66.60	84.95	94.40
	Koch	0.15	1.00	6.30	14.70	31.25	51.10	66.40	0.45	12.85	34.60	53.60	80.70	94.80	98.80
	Glmm Wald II	1.3	1.6	4.9	12.9	30.8	51.2	68.8	2.0	2.2	2.9	5.4	30.6	64.1	86.3
	Glmm Wald III	1.3	1.6	3.3	4.9	10.8	20.9	29.7	2.0	2.0	2.0	2.1	3.1	4.2	6.3
	Glmm Fan&Zhang	1.7	2.0	4.9	7.9	11.9	16.4	22.6	2.0	2.0	2.0	2.1	2.6	2.7	3.6
	Gee Gosho/Wald	0.0	0.2	1.5	3.2	8.6	19.5	27.4		0.0	0.3	1.1	4.4	10.3	17.7
	Gee Gosho/F&Z	0.0	0.0	1.0	2.8	5.2	12.1	17.2		0.0	0.4	2.2	5.0	11.9	16.8
	Gee Gosho/Pan	0.3	0.5	2.3	5.0	10.6	22.2	30.0		0.1	0.9	3.3	6.7	13.9	22.0
	Gee Liang&Zeger	0.3	1.6	4.1	6.8	10.4	15.4	21.0	0	1.8	3.0	6.5	9.4	14.6	21.2

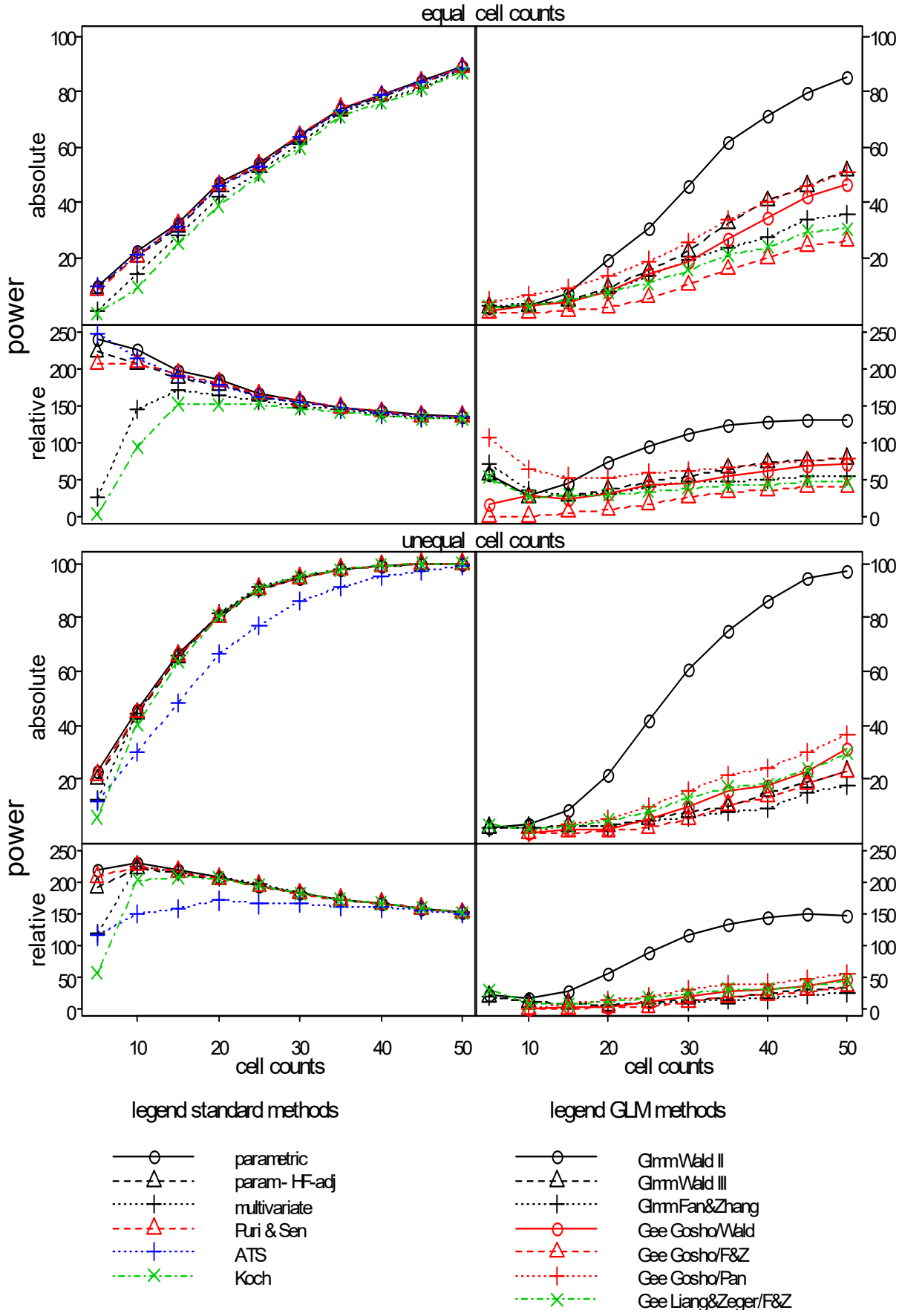
Graphic for α=0.05:



8. 2. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	9.60	22.45	32.45	47.35	64.60	79.05	89.15	22.75	45.65	66.50	80.85	94.55	99.05	99.85
	par./ HF-corr.	8.90	20.50	30.90	45.70	63.45	78.65	88.75	19.90	43.85	65.25	79.85	94.35	99.05	99.85
	multivariate	1.05	14.25	28.45	41.90	61.25	77.00	87.85	12.25	44.30	65.60	81.30	95.00	99.10	99.80
	Puri & Sen	8.25	20.55	31.95	46.50	64.25	78.90	89.10	21.55	44.60	65.75	80.20	94.50	99.05	99.85
	ATS	9.85	21.15	31.35	45.90	63.65	78.70	88.85	11.95	29.75	48.40	66.60	86.15	94.95	98.85
	Koch	0.10	9.35	25.10	38.90	59.95	75.95	87.20	5.85	40.30	63.30	80.35	94.80	99.10	99.80
	Glmm Wald II	2.2	2.7	7.3	19.1	45.9	71.4	85.3	2.2	3.1	8.7	21.6	60.4	86.1	97.2
	Glmm Wald III	2.2	2.5	4.6	9.2	22.1	40.7	51.4	2.0	2.0	2.8	2.4	7.9	15.2	22.8
	Glmm Fan&Zhang	2.8	3.6	4.7	7.7	19.3	27.3	35.5	2.0	2.2	2.4	2.3	5.8	9.2	17.3
	Gee Gosho/Wald	0.6	2.8	4.0	8.1	18.4	34.5	46.7		0.0	1.2	1.6	9.7	17.7	31.3
	Gee Gosho/F&Z	0.0	0.0	0.9	2.1	10.1	20.0	26.1		0.0	0.2	0.8	5.3	13.3	22.7
	Gee Gosho/Pan	4.3	6.2	8.8	13.6	25.5	39.9	51.0		0.0	3.0	5.3	15.7	23.9	36.6
	Gee Liang&Zeger	2.1	2.6	4.7	7.5	15.6	24.0	30.5	3.1	1.5	2.5	4.7	12.8	18.1	29.4
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	2.05	7.35	13.00	21.75	39.55	57.00	71.45	5.95	22.20	41.80	60.80	84.30	96.15	99.15
	par./ HF-corr.	1.80	5.95	11.50	19.55	37.55	55.50	70.20	4.60	19.85	39.20	58.55	83.35	95.95	99.00
	multivariate	0.25	2.25	8.05	17.85	35.35	53.80	68.45	1.75	18.10	40.35	58.95	84.55	96.15	99.00
	Puri & Sen	0.95	5.85	11.20	20.05	38.20	55.90	70.85	4.65	21.20	40.30	60.05	84.00	96.10	99.00
	ATS	2.35	6.80	11.55	20.15	37.75	55.75	70.35	3.35	10.30	22.50	37.55	65.35	83.10	93.90
	Koch	0.05	0.20	3.85	12.25	30.70	49.70	66.20	0.05	10.70	34.05	54.50	82.70	95.65	98.85
	Glmm Wald II	2.0	1.9	1.9	3.4	18.9	40.4	62.0	2.0	2.2	2.9	5.4	30.6	64.1	86.3
	Glmm Wald III	2.1	1.9	1.6	1.9	6.3	12.1	22.0	2.0	2.0	2.0	2.1	3.1	4.2	6.3
	Glmm Fan&Zhang	2.1	1.9	1.7	1.9	4.0	7.2	10.7	2.0	2.0	2.0	2.1	2.6	2.7	3.6
	Gee Gosho/Wald	0.6	0.3	0.6	1.9	6.1	11.9	20.4		0.0	0.0	0.4	2.0	4.2	8.8
	Gee Gosho/F&Z	0.0	0.0	0.1	0.1	0.6	2.5	5.4		0.0	0.0	0.0	0.3	1.5	3.6
	Gee Gosho/Pan	2.4	1.5	1.5	2.8	8.2	14.0	24.1		0.0	0.5	0.5	2.7	5.1	11.8
	Gee Liang&Zeger	2.1	0.7	0.7	0.4	2.8	5.3	9.0	3.1	0.8	0.2	0.4	1.8	3.8	7.0

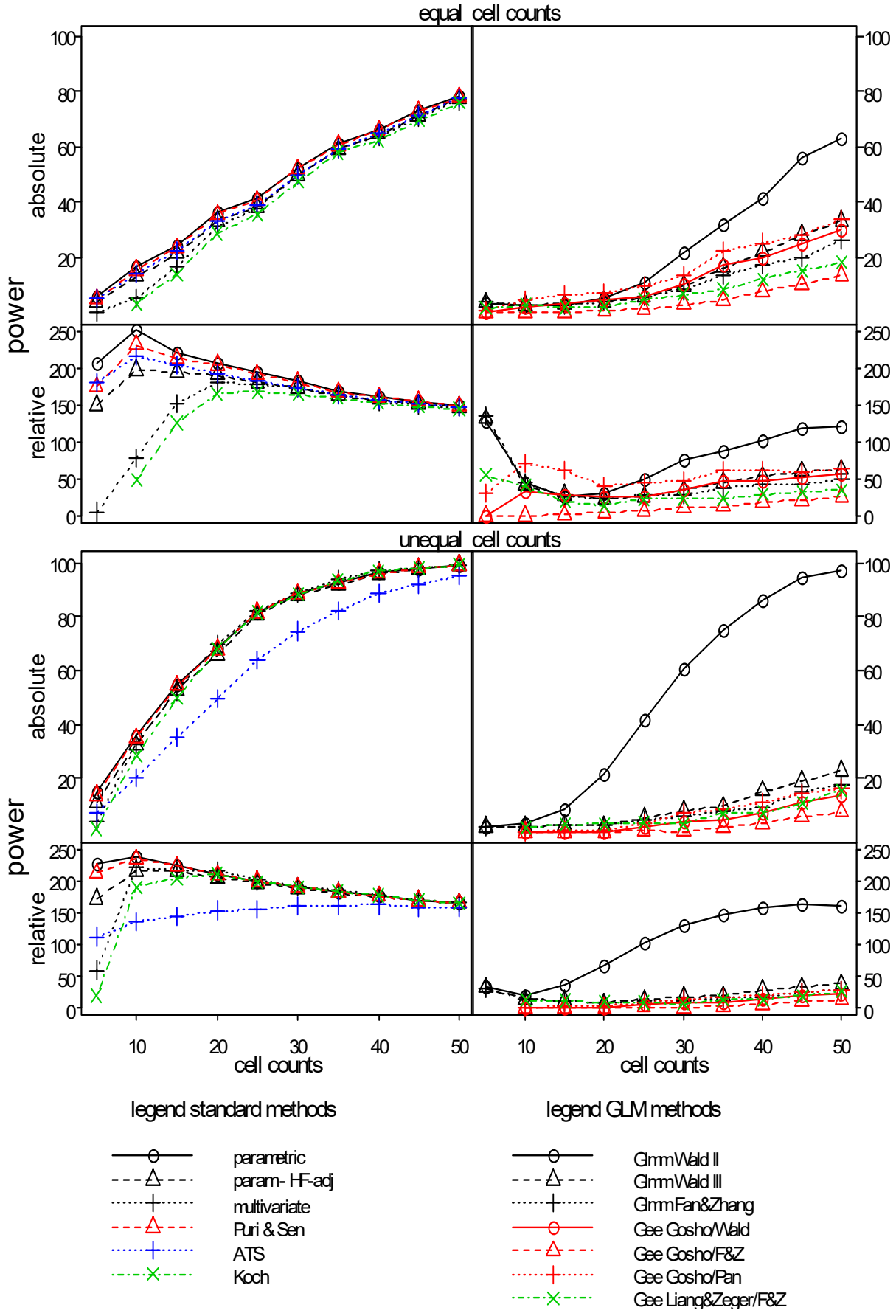
Graphic for α=0.05:



8. 2. 1. 3 p = 0.9

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	5.70	16.80	24.30	36.10	52.30	66.25	78.20	14.70	35.70	54.80	68.15	88.50	96.15	99.20
	par./ HF-corr.	4.15	13.15	21.45	33.25	49.85	64.60	77.50	11.10	32.30	52.45	65.95	87.70	95.90	99.15
	multivariate	0.15	5.25	16.65	31.50	49.70	63.60	76.80	3.85	32.90	52.45	69.45	88.85	96.90	99.20
	Puri & Sen	4.85	15.40	23.45	35.60	52.00	66.05	78.00	13.75	35.05	54.40	67.70	88.30	96.05	99.20
	ATS	5.00	14.40	22.50	33.40	49.95	64.75	77.60	7.25	20.25	35.10	49.60	74.55	88.60	95.00
	Koch	0.05	3.25	13.85	28.80	47.40	62.45	76.05	1.25	28.40	49.65	67.95	88.25	96.75	99.15
	Glmm Wald II	3.6	2.9	2.8	5.4	21.6	41.8	63.4	2.2	3.1	8.7	21.6	60.4	86.1	97.2
	Glmm Wald III	3.7	2.7	3.2	4.0	9.9	22.1	33.3	2.0	2.0	2.8	2.4	7.9	15.2	22.8
	Glmm Fan&Zhang	3.8	2.9	2.7	4.0	8.1	17.4	26.0	2.0	2.2	2.4	2.3	5.8	9.2	17.3
	Gee Gosho/Wald	0.0	2.2	3.1	4.7	10.3	19.8	30.0		0.0	0.0	0.0	3.9	7.0	13.5
	Gee Gosho/F&Z	0.0	0.0	0.2	0.6	3.0	7.7	13.6		0.0	0.0	0.0	0.3	3.4	7.5
	Gee Gosho/Pan	0.8	4.7	6.8	7.1	13.3	25.3	34.0		0.0	0.9	0.9	6.9	11.2	16.0
	Gee Liang&Zeger	1.5	2.7	2.1	2.4	6.8	12.0	18.2		1.8	2.7	3.1	2.9	7.2	15.4
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	1.20	4.05	7.90	14.85	27.30	40.95	55.80	3.60	14.50	27.70	41.25	69.50	86.90	95.35
	par./ HF-corr.	0.95	1.80	5.45	11.25	23.85	37.80	52.20	1.90	11.45	23.40	37.50	67.35	85.45	94.75
	multivariate	0.05	0.60	2.15	9.15	22.60	36.95	53.05	0.45	7.85	25.85	41.35	71.40	88.05	95.65
	Puri & Sen	0.90	2.95	6.60	12.80	26.25	40.15	54.85	2.75	13.60	26.45	39.90	69.15	86.60	95.20
	ATS	1.40	2.30	6.05	11.90	24.50	38.25	52.35	1.80	4.40	10.90	21.10	45.80	68.20	83.45
	Koch	0.05	0.05	0.55	5.45	19.15	33.10	50.40	0.05	4.25	19.70	37.05	69.30	87.15	95.25
	Glmm Wald II	3.6	2.2	2.0	2.3	5.1	17.5	32.0	2	2.2	2.9	5.4	30.6	64.1	86.3
	Glmm Wald III	3.7	2.3	2.0	2.0	2.9	5.1	11.0	2	2.0	2.0	2.1	3.1	4.2	6.3
	Glmm Fan&Zhang	3.7	2.0	2.1	2.3	2.4	3.6	5.6	2	2.0	2.0	2.1	2.6	2.7	3.6
	Gee Gosho/Wald	0.0	1.1	0.6	1.0	2.6	5.1	10.4		0.0	0.0	0.0	1.0	0.9	2.4
	Gee Gosho/F&Z	0.0	0.0	0.0	0.0	0.1	0.1	1.1		0.0	0.0	0.0	0.0	0.2	0.1
	Gee Gosho/Pan	0.0	1.8	0.9	1.7	3.3	5.6	12.6		0.0	0.0	0.0	1.3	1.1	3.3
	Gee Liang&Zeger	1.5	2.4	0.9	0.3	0.5	0.9	2.5		1.8	0.9	1.8	0.7	0.6	0.7

Graphic for α=0.05:

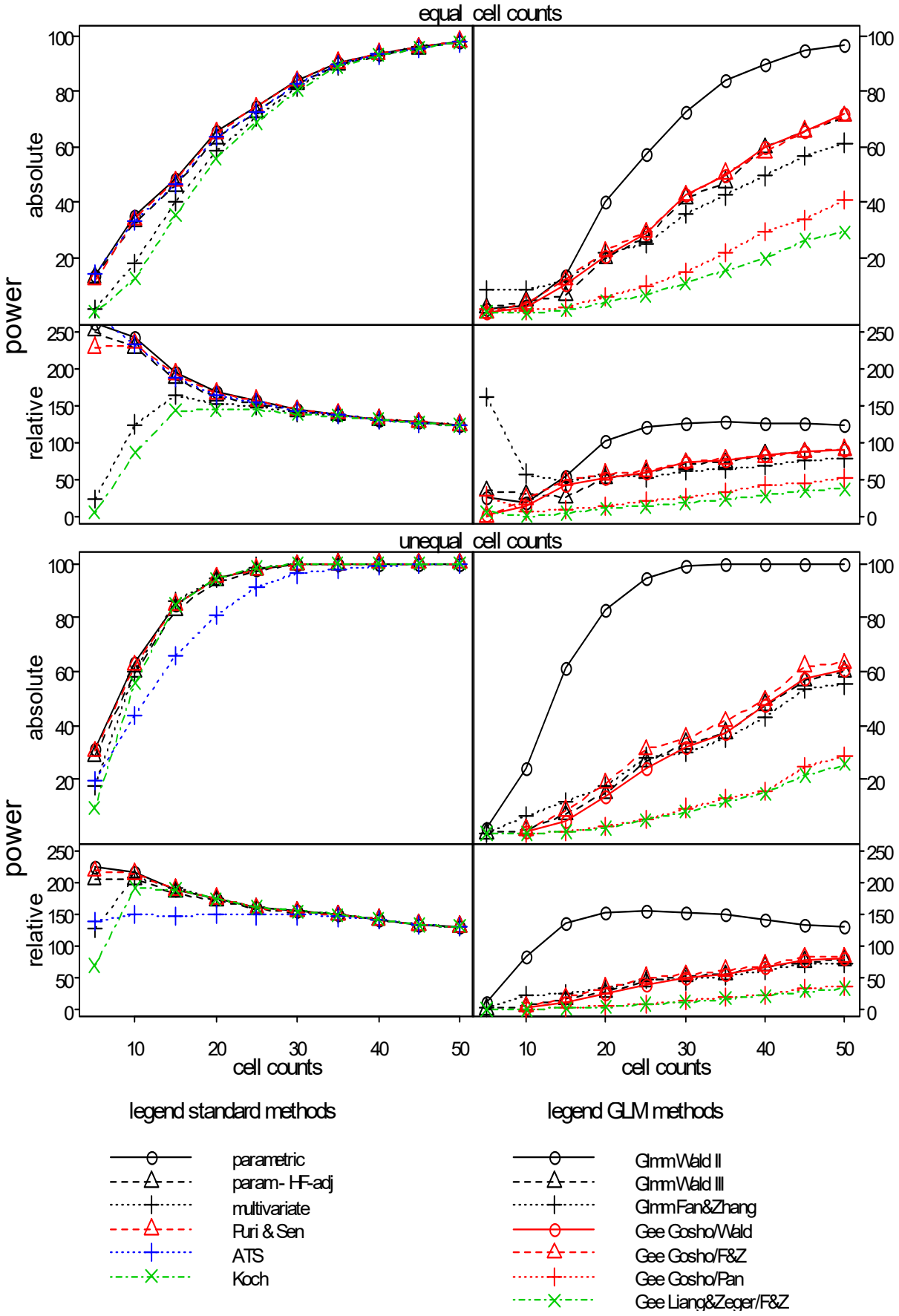


8. 2. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

8. 2. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	13.65	35.00	48.30	65.65	84.05	93.70	98.20	14.70	35.70	54.80	68.15	88.50	96.15	99.20
	par./ HF-corr.	13.05	32.85	45.95	63.30	82.90	93.30	97.80	11.10	32.30	52.45	65.95	87.70	95.90	99.15
	multivariate	1.25	17.90	40.25	58.85	81.60	93.65	97.95	3.85	32.90	52.45	69.45	88.85	96.90	99.20
	Puri & Sen	11.90	33.60	47.70	65.00	83.80	93.60	98.05	13.75	35.05	54.40	67.70	88.30	96.05	99.20
	ATS	14.25	33.55	46.55	63.60	83.10	93.35	97.80	7.25	20.25	35.10	49.60	74.55	88.60	95.00
	Koch	0.25	12.35	35.35	56.00	80.55	93.20	97.90	1.25	28.40	49.65	67.95	88.25	96.75	99.15
	Glmm Wald II	1.3	2.7	13.7	40.0	72.5	90.1	97.0	1.7	24.3	61.2	82.9	99.1	99.9	99.5
	Glmm Wald III	1.8	4.3	6.3	19.8	41.6	59.8	71.0	0.1	1.4	7.1	14.7	33.4	47.7	59.9
	Glmm Fan&Zhang	8.4	8.3	11.6	21.7	35.6	49.5	61.5	0.3	6.6	11.6	17.8	29.8	43.3	55.1
	Gee Gosho/Wald	0.1	2.0	10.3	20.7	42.6	59.7	71.8		0.5	4.8	13.4	32.2	47.6	60.8
	Gee Gosho/F&Z	0.0	3.4	12.0	22.2	42.4	57.8	71.2		1.2	8.5	18.5	35.3	49.3	63.0
	Gee Gosho/Pan	1.4	0.9	2.2	5.7	15.0	29.5	40.9		0.1	0.8	2.7	9.4	15.5	28.4
	Gee Liang&Zeger	0.3	0.1	1.1	4.3	10.7	19.7	29.3	0.0	0.0	0.7	2.0	8.1	14.8	25.5
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	2.90	13.30	23.95	39.80	63.25	82.80	91.55	3.60	14.50	27.70	41.25	69.50	86.90	95.35
	par./ HF-corr.	2.65	10.75	21.55	36.00	59.75	80.05	90.35	1.90	11.45	23.40	37.50	67.35	85.45	94.75
	multivariate	0.20	3.20	11.70	28.25	58.70	78.90	89.90	0.45	7.85	25.85	41.35	71.40	88.05	95.65
	Puri & Sen	1.35	10.50	22.10	37.50	62.35	81.95	91.45	2.75	13.60	26.45	39.90	69.15	86.60	95.20
	ATS	3.55	12.60	22.35	36.95	60.30	80.75	90.50	1.80	4.40	10.90	21.10	45.80	68.20	83.45
	Koch	0.05	0.40	6.15	21.05	52.65	77.15	89.05	0.05	4.25	19.70	37.05	69.30	87.15	95.25
	Glmm Wald II	0.7	0.4	0.9	10.6	41.6	68.6	85.8	0.1	6.9	28.1	56.0	93.0	98.8	99.9
	Glmm Wald III	0.8	1.7	0.7	2.7	13.4	28.0	41.5	0.0	0.0	0.3	3.2	10.6	18.5	31.3
	Glmm Fan&Zhang	1.8	3.1	1.8	5.0	11.9	22.2	30.1	0.0	0.4	1.5	4.3	9.3	17.8	26.8
	Gee Gosho/Wald	0.0	0.4	2.3	5.4	17.6	32.2	43.7		0.0	0.7	2.9	11.0	22.9	34.2
	Gee Gosho/F&Z	0.0	0.1	2.7	7.3	18.9	33.4	45.4		0.0	1.5	5.3	16.3	28.5	40.4
	Gee Gosho/Pan	0.9	0.2	0.1	0.7	4.0	9.9	17.7		0.0	0.2	0.4	1.7	4.6	9.4
	Gee Liang&Zeger	0.3	0.1	0.0	0.1	0.7	3.7	7.2	0.0	0.0	0.1	0.1	0.7	1.5	5.2

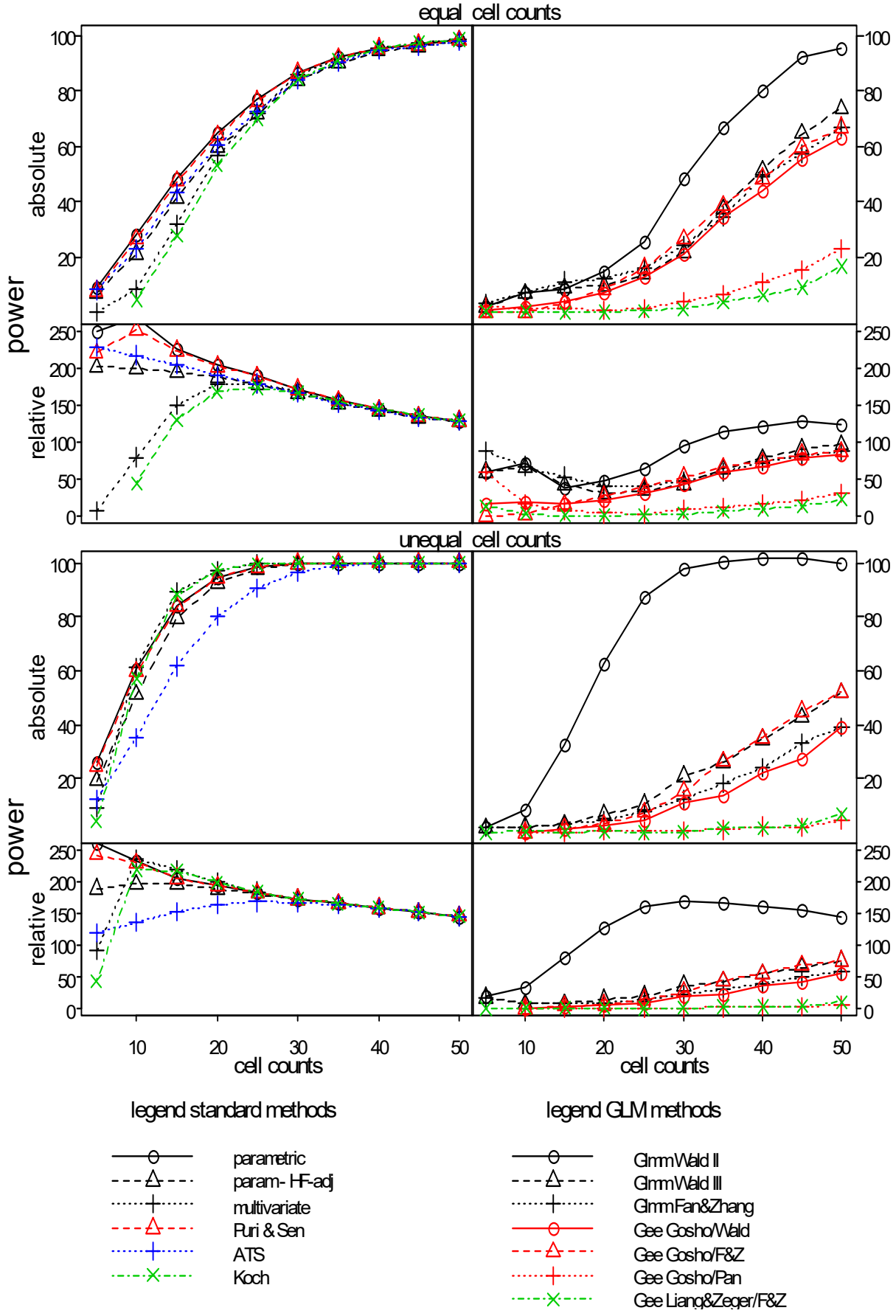
Graphic for α=0.05:



8. 2. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	8.95	28.45	48.25	65.05	86.95	95.65	98.55	26.30	60.75	83.80	94.55	99.80	100.0	100
	par./ HF-corr.	7.20	21.10	41.20	59.60	84.00	94.55	98.30	19.10	51.05	79.55	92.65	99.55	100.0	100
	multivariate	0.25	8.40	31.70	56.50	85.80	95.80	98.75	9.20	61.45	89.40	97.30	99.85	100.0	100
	Puri & Sen	7.90	26.60	47.50	64.00	86.80	95.55	98.55	24.50	59.60	83.70	94.55	99.80	100.0	100
	ATS	8.15	23.05	43.35	60.40	84.40	94.70	98.30	12.10	35.20	61.60	79.90	96.70	99.65	100
	Koch	0.05	4.65	27.60	53.10	84.35	95.65	98.70	4.45	56.90	88.15	97.20	99.85	100.0	100
	Glmm Wald II	2.1	7.4	8.1	14.7	48.6	80.6	95.3	1.9	8.5	32.8	62.7	98.0	100.0	100
	Glmm Wald III	2.1	6.9	9.0	9.8	21.5	51.4	73.6	1.7	2.0	3.0	6.8	20.8	34.7	51.8
	Glmm Fan&Zhang	3.1	7.1	11.3	12.4	24.1	49.2	66.7	1.8	2.2	3.0	4.5	12.4	24.3	39.3
	Gee Gosho/Wald	0.6	1.9	3.7	6.9	20.9	44.1	63.4		0.0	1.6	2.9	10.8	22.1	38.8
	Gee Gosho/F&Z	0.0	0.2	3.3	8.4	26.6	48.5	66.9		0.0	1.6	3.2	15.3	34.9	51.9
	Gee Gosho/Pan	2.1	1.8	1.7	1.0	4.1	10.8	22.9		0.0	0.2	0.4	0.6	2.2	4.4
	Gee Liang&Zeger	0.5	0.3	0.0	0.2	1.1	6.1	16.7	0.0	0.4	0.3	0.4	0.3	1.9	7.0
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	2.30	8.15	22.00	37.95	64.35	83.95	94.00	8.00	29.20	59.65	81.65	98.00	99.8	99.95
	par./ HF-corr.	1.30	4.60	14.30	26.80	56.10	77.45	90.60	4.00	19.70	47.00	71.70	96.10	99.7	99.90
	multivariate	0.05	0.85	6.85	21.10	58.35	82.95	93.45	1.10	27.50	67.95	89.05	99.40	100.0	100.0
	Puri & Sen	1.05	6.30	18.85	34.30	62.85	83.00	93.45	6.80	27.15	58.20	80.40	97.95	99.8	99.95
	ATS	1.80	5.50	16.15	29.55	57.05	78.25	90.90	3.35	9.30	25.50	46.45	82.90	95.7	99.35
	Koch	0.05	0.05	2.60	13.60	53.10	80.00	92.80	0.05	17.45	60.80	87.20	99.35	100.0	100.0
	Glmm Wald II	1.8	4.7	3.9	2.9	15.1	47.9	78.3	1.7	2.3	8.4	29.8	83.0	99.5	100.0
	Glmm Wald III	1.7	3.7	4.2	2.9	5.1	12.9	32.5	1.7	1.6	1.8	1.8	5.3	10.3	19.7
	Glmm Fan&Zhang	1.7	3.0	4.2	3.6	4.1	10.4	21.0	1.7	1.6	1.7	1.8	2.3	4.0	10.3
	Gee Gosho/Wald	0.3	0.5	0.8	0.9	4.6	14.6	28.5		0.0	0.2	0.5	1.5	4.4	9.0
	Gee Gosho/F&Z	0.0	0.0	0.2	0.8	4.7	17.4	31.5		0.0	0.2	0.2	2.4	6.0	19.0
	Gee Gosho/Pan	1.5	0.6	0.7	0.3	0.3	1.6	3.2		0.0	0.0	0.1	0.0	0.4	0.6
	Gee Liang&Zeger	0.5	0.3	0.0	0.1	0.1	0.1	0.4	0.0	0.4	0.3	0.4	0.1	0.0	0.0

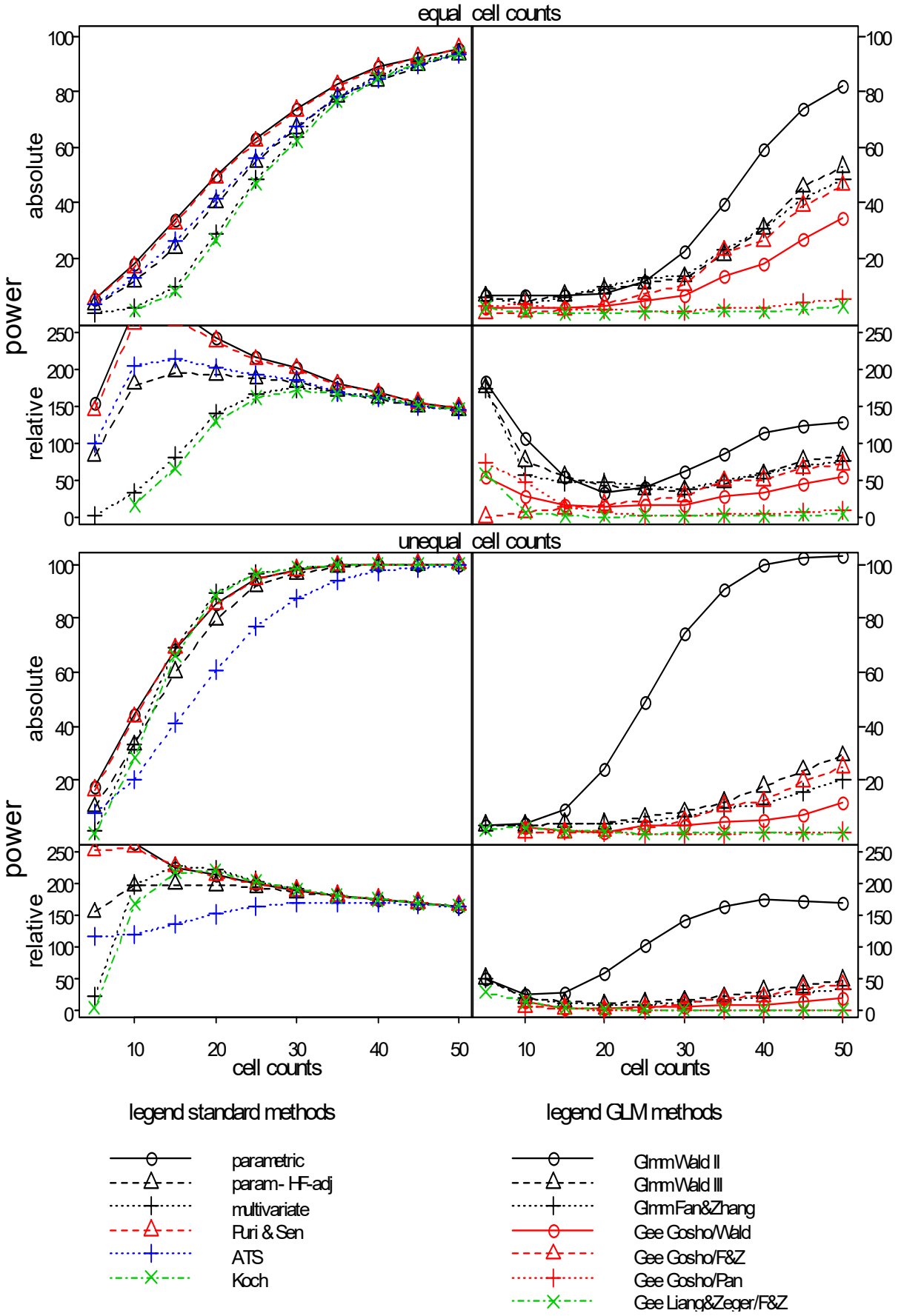
Graphic for α=0.05:



8. 2. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	5.45	18.00	34.05	49.95	74.15	89.00	95.70	17.55	44.35	68.35	85.55	97.75	99.95	100.0
	par./ HF-corr.	2.95	11.50	23.85	39.80	67.00	84.25	93.65	10.05	33.10	60.10	79.40	96.40	99.65	100.0
	multivariate	0.05	2.15	9.95	28.75	63.85	86.05	94.15	1.45	33.40	69.30	89.10	98.60	100.0	100.0
	Puri & Sen	5.10	16.75	32.40	49.05	73.35	88.55	95.55	16.30	43.20	68.75	85.25	97.75	99.95	100.0
	ATS	3.55	13.10	26.05	41.75	67.80	84.65	93.70	7.60	20.05	41.35	60.90	87.20	97.40	99.55
	Koch	0.05	1.05	7.95	26.55	62.45	85.00	93.85	0.25	28.25	65.90	88.30	98.55	99.85	100.0
	Glmm Wald II	6.5	6.8	6.6	6.9	22.4	59.3	82.3	3.3	4.1	8.9	23.9	74.0	99.7	99.9
	Glmm Wald III	6.2	4.9	6.7	8.7	13.2	30.7	52.9	3.3	3.3	4.1	4.0	8.2	17.6	29.1
	Glmm Fan&Zhang	6.2	3.7	5.9	9.6	13.5	30.7	48.6	3.3	3.3	3.8	3.6	6.6	11.4	20.3
	Gee Gosho/Wald	1.9	1.8	1.9	2.6	6.3	17.9	34.4		2.3	1.2	0.8	3.5	5.2	12.0
	Gee Gosho/F&Z	0.0	0.4	1.4	3.3	10.2	26.1	46.1		0.8	0.8	1.0	5.2	12.1	24.8
	Gee Gosho/Pan	2.6	3.1	1.6	1.3	0.9	2.0	5.4		0.8	1.2	0.5	0.2	0.5	0.9
	Gee Liang&Zeger	2.1	0.4	0.2	0.1	0.4	0.7	2.7	1.9	2.3	1.2	1.0	0.5	0.5	0.4
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	1.10	4.50	10.65	20.65	45.80	66.80	84.80	5.30	17.05	36.95	61.35	89.00	98.45	99.85
	par./ HF-corr.	0.30	1.20	4.20	10.50	32.90	55.45	76.15	1.70	8.05	23.10	44.45	80.45	96.20	99.50
	multivariate	0.05	0.35	0.95	5.30	30.85	61.25	81.80	0.10	7.50	38.40	67.85	94.90	99.60	100.0
	Puri & Sen	0.60	3.45	9.70	18.35	43.75	65.85	84.25	4.35	16.05	35.40	60.50	88.70	98.35	99.80
	ATS	0.55	1.60	5.55	12.05	34.55	56.70	77.00	2.30	3.75	10.90	22.80	59.05	83.00	93.95
	Koch	0.05	0.05	0.25	2.75	24.50	56.80	79.80	0.05	3.35	30.15	62.70	94.35	99.45	99.90
	Glmm Wald II	6.4	4.5	4.5	4.4	4.1	19.8	50.3	3.3	3.5	4.4	7.2	37.4	81.5	99.9
	Glmm Wald III	6.2	3.8	3.8	4.1	4.5	6.9	15.2	3.3	3.3	3.3	3.3	3.6	5.0	7.9
	Glmm Fan&Zhang	6.1	2.6	3.2	4.3	5.4	6.2	11.2	3.3	3.3	3.4	3.3	3.4	3.7	3.9
	Gee Gosho/Wald	1.9	1.0	0.7	0.5	1.0	3.2	7.7		1.6	0.4	0.3	0.5	0.5	1.7
	Gee Gosho/F&Z	0.0	0.0	0.0	0.2	1.1	4.0	12.4		0.8	0.4	0.3	0.0	1.3	2.5
	Gee Gosho/Pan	2.6	1.0	0.9	0.8	0.1	0.1	0.8		0.8	1.2	0.5	0.0	0.0	0.3
	Gee Liang&Zeger	2.1	0.4	0.2	0.1	0.1	0.0	0.1	1.9	2.3	1.2	1.0	0.5	0.2	0.1

Graphic for α=0.05:



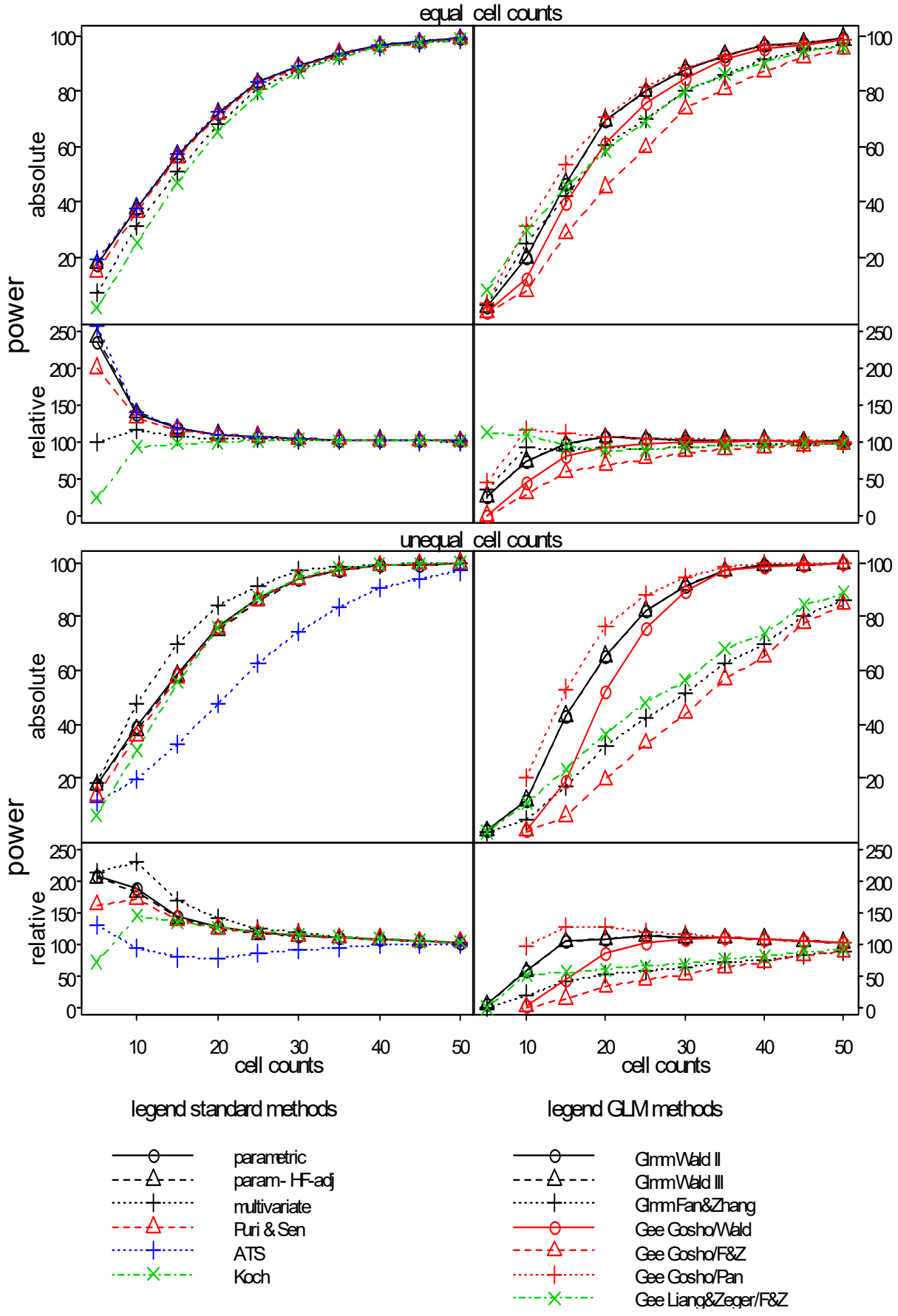
8. 3. Interaction effect AB (effects ab_{ij} = 0.4*s)

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

8. 3. 1. 1 p = 0.5

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	17.45	37.50	57.05	72.30	89.15	96.60	99.25	17.75	38.85	58.90	76.15	93.95	98.80	99.8
	par./ HF-corr.	17.85	37.65	56.95	72.20	89.05	96.55	99.25	17.45	37.75	58.05	75.05	93.55	98.70	99.7
	multivariate	7.35	31.40	51.30	68.40	87.90	96.45	98.95	18.30	47.40	69.45	84.10	96.95	99.20	99.9
	Puri & Sen	14.80	36.10	56.10	71.60	88.85	96.45	99.20	13.85	35.70	57.40	75.35	93.80	98.75	99.8
	ATS	19.00	38.00	57.50	72.45	89.00	96.55	99.25	11.25	19.75	32.65	47.35	74.20	90.75	96.8
	Koch	1.75	25.25	47.10	65.55	87.25	96.15	98.85	6.20	30.05	55.50	75.70	94.65	99.30	99.8
	Glmm Wald II	1.9	20.0	46.7	69.6	88.0	96.5	99.4	0.4	11.9	43.1	65.2	91.5	98.8	99.4
	Glmm Wald III	1.9	20.0	46.7	69.6	88.0	96.5	99.4	0.4	11.9	43.1	65.2	91.5	98.8	99.4
	Glmm Fan&Zhang	2.6	24.8	42.4	60.3	80.1	91.7	96.6	0.0	4.3	17.0	32.2	51.7	69.4	85.9
	Gee Gosho/Wald	0.0	12.4	39.4	61.1	84.9	95.8	98.5		0.5	18.9	51.9	89.4	98.7	99.6
	Gee Gosho/F&Z	0.0	7.9	28.4	45.3	73.8	87.4	95.2		0.2	5.9	19.3	43.9	64.9	84.3
	Gee Gosho/Pan	3.3	31.5	53.5	70.8	88.7	96.8	98.8		20.2	53.1	76.2	94.6	99.6	99.6
	Gee Liang&Zeger	8.3	29.5	45.5	58.6	80.0	90.3	96.0	0	10.7	23.3	36.4	56.4	73.6	88.7
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	5.30	16.75	31.75	48.05	74.20	88.15	95.40	4.95	16.75	34.30	51.95	82.40	95.15	98.60
	par./ HF-corr.	4.45	16.40	31.45	47.70	74.10	87.80	95.45	5.00	15.35	32.40	49.65	80.55	94.45	98.45
	multivariate	1.55	9.75	23.75	41.00	69.20	85.20	94.45	5.70	22.30	43.45	63.95	88.20	96.55	99.30
	Puri & Sen	2.80	14.60	28.75	45.95	73.45	87.80	95.25	3.40	14.10	30.80	48.90	81.25	94.85	98.45
	ATS	6.90	17.80	32.55	48.60	74.45	88.05	95.45	4.30	7.05	11.65	22.30	47.45	70.00	86.60
	Koch	0.35	2.35	15.30	33.65	65.15	83.50	93.85	0.50	7.20	25.55	47.35	81.55	95.65	99.00
	Glmm Wald II	0.6	1.3	16.1	38.2	70.8	86.2	95.4	0.3	2.6	16.1	35.9	73.8	94.1	98.3
	Glmm Wald III	0.6	1.3	16.1	38.2	70.8	86.2	95.4	0.3	2.6	16.1	35.9	73.8	94.1	98.3
	Glmm Fan&Zhang	1.2	6.4	17.6	33.5	57.6	73.0	87.2	0.0	1.3	6.8	13.2	26.0	41.8	60.6
	Gee Gosho/Wald	0.0	2.0	14.5	33.8	65.9	83.4	93.7		0.2	4.8	25.6	70.2	94.7	98.6
	Gee Gosho/F&Z	0.0	0.8	8.6	19.8	46.8	65.6	81.3		0.0	1.1	5.9	19.5	38.0	58.7
	Gee Gosho/Pan	0.2	7.6	24.5	42.1	70.1	85.1	94.3		3.7	25.0	48.6	82.6	97.3	98.9
	Gee Liang&Zeger	1.5	10.3	20.8	32.2	57.9	72.3	85.6	0	2.8	7.6	16.4	30.2	47.8	67.7

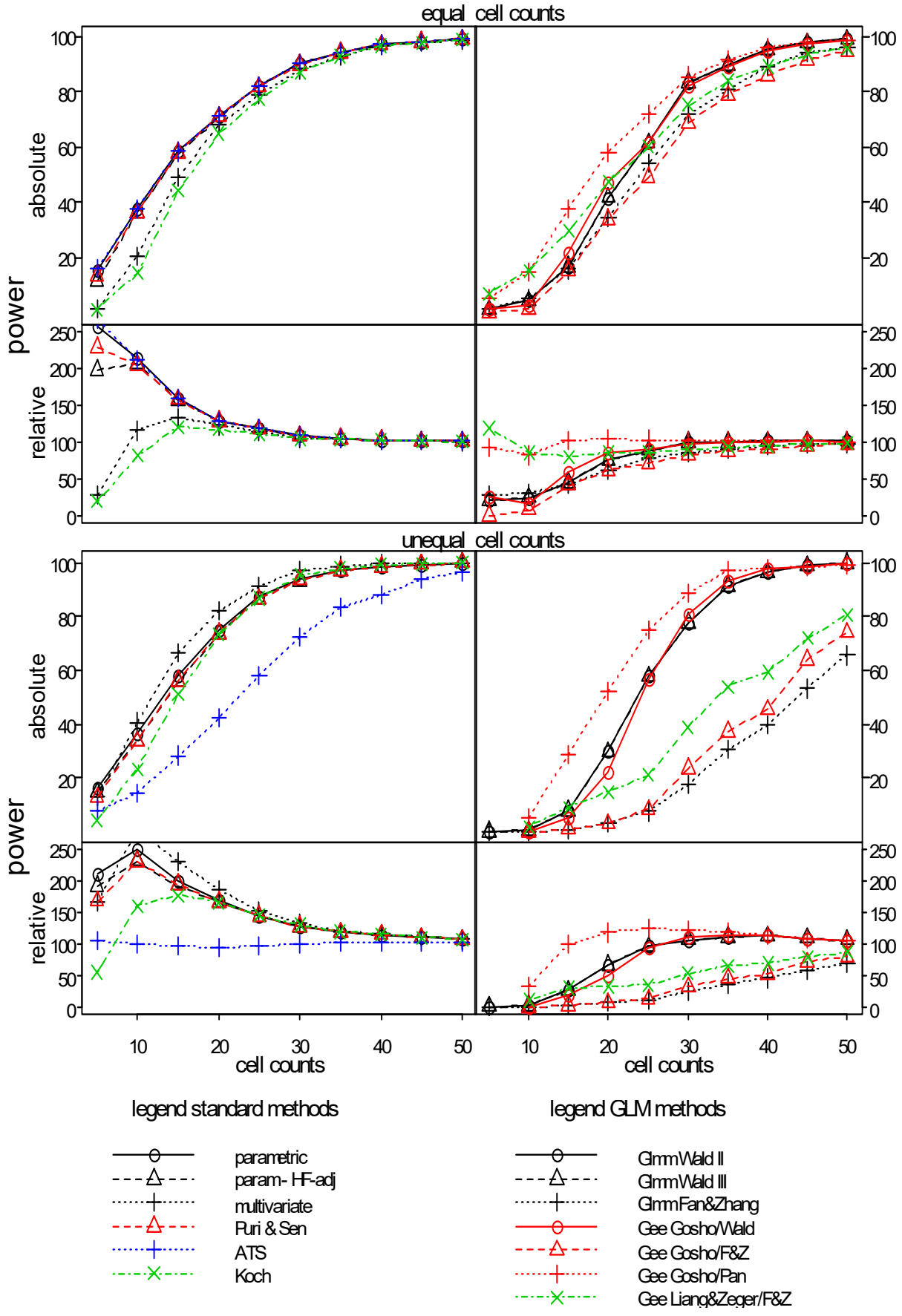
Graphic for α=0.05:



8. 3. 1. 2 p = 0.8

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	15.25	37.95	58.85	71.55	90.45	97.25	99.20	16.40	36.50	58.10	75.00	93.60	98.60	99.90
	par./ HF-corr.	11.75	36.55	57.65	71.00	90.20	97.10	99.15	14.85	33.75	55.60	73.35	93.00	98.15	99.90
	multivariate	1.65	20.45	49.10	68.00	88.20	97.00	98.80	12.85	40.70	66.60	82.30	96.90	99.45	99.95
	Puri & Sen	13.55	36.25	58.20	71.15	89.95	97.15	99.20	12.95	33.70	56.15	73.70	93.45	98.45	99.90
	ATS	15.85	37.50	58.40	71.20	90.25	97.15	99.20	8.15	14.55	28.30	42.20	72.55	88.20	96.30
	Koch	1.15	14.40	44.25	65.05	87.10	96.85	98.80	4.30	23.30	51.05	73.10	95.40	99.30	99.90
	Glmm Wald II	1.2	4.3	16.7	41.8	83.5	95.5	99.3	0.1	0.4	7.9	29.8	77.7	96.3	99.7
	Glmm Wald III	1.2	4.3	16.7	41.8	83.5	95.5	99.3	0.1	0.4	7.9	29.8	77.7	96.3	99.7
	Glmm Fan&Zhang	1.6	5.3	15.8	34.5	72.2	89.1	96.4	0.0	0.0	0.9	3.4	17.8	39.5	65.5
	Gee Gosho/Wald	1.6	2.8	22.1	47.1	82.1	94.9	98.6		0.0	5.3	22.2	81.0	97.4	99.6
	Gee Gosho/F&Z	0.0	1.3	15.1	33.9	68.6	85.8	94.7		0.0	0.9	3.2	23.6	45.5	74.1
	Gee Gosho/Pan	5.5	14.5	37.7	58.2	85.7	96.0	98.8		4.9	28.6	52.2	88.4	97.6	99.2
	Gee Liang&Zeger	7.1	15.1	29.5	47.5	75.4	89.2	96.1		1.6	8.8	14.7	39.0	59.3	80.7
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	4.25	15.40	31.85	48.30	75.10	89.80	96.70	4.55	16.15	31.35	50.00	80.85	94.40	99.15
	par./ HF-corr.	2.35	12.90	29.90	47.20	74.30	89.45	96.40	3.35	14.10	28.70	47.35	79.30	93.75	99.10
	multivariate	0.20	2.90	15.55	35.85	69.05	86.25	95.80	2.95	14.65	37.35	60.20	87.05	96.90	99.50
	Puri & Sen	1.45	12.40	29.15	45.95	73.95	89.35	96.50	2.20	12.85	28.35	47.40	79.85	94.30	99.15
	ATS	4.35	15.95	31.65	47.80	74.45	89.80	96.55	2.90	4.50	9.70	16.95	41.70	64.85	86.10
	Koch	0.85	0.60	8.05	26.65	64.30	84.55	95.00	0.55	5.10	18.95	40.70	80.15	95.30	99.25
	Glmm Wald II	1.0	1.7	2.8	11.9	53.3	81.9	94.0	0.1	0.1	1.4	7.8	52.5	86.3	97.7
	Glmm Wald III	1.0	1.7	2.8	11.9	53.3	81.9	94.0	0.1	0.1	1.4	7.8	52.5	86.3	97.7
	Glmm Fan&Zhang	1.2	1.9	4.7	14.8	44.8	71.1	84.5	0.0	0.0	0.2	0.3	4.9	16.8	36.0
	Gee Gosho/Wald	0.8	0.7	3.2	15.7	52.7	79.7	94.1		0.0	0.4	5.0	51.7	89.7	97.4
	Gee Gosho/F&Z	0.0	0.0	2.0	9.0	36.3	61.1	80.3		0.0	0.0	0.0	2.9	16.1	36.9
	Gee Gosho/Pan	3.1	2.0	8.7	24.6	60.1	82.4	94.7		0.0	9.7	18.6	69.4	92.5	98.0
	Gee Liang&Zeger	3.8	2.8	10.8	20.0	46.3	68.0	83.8		1.6	1.8	4.6	10.1	25.7	47.1

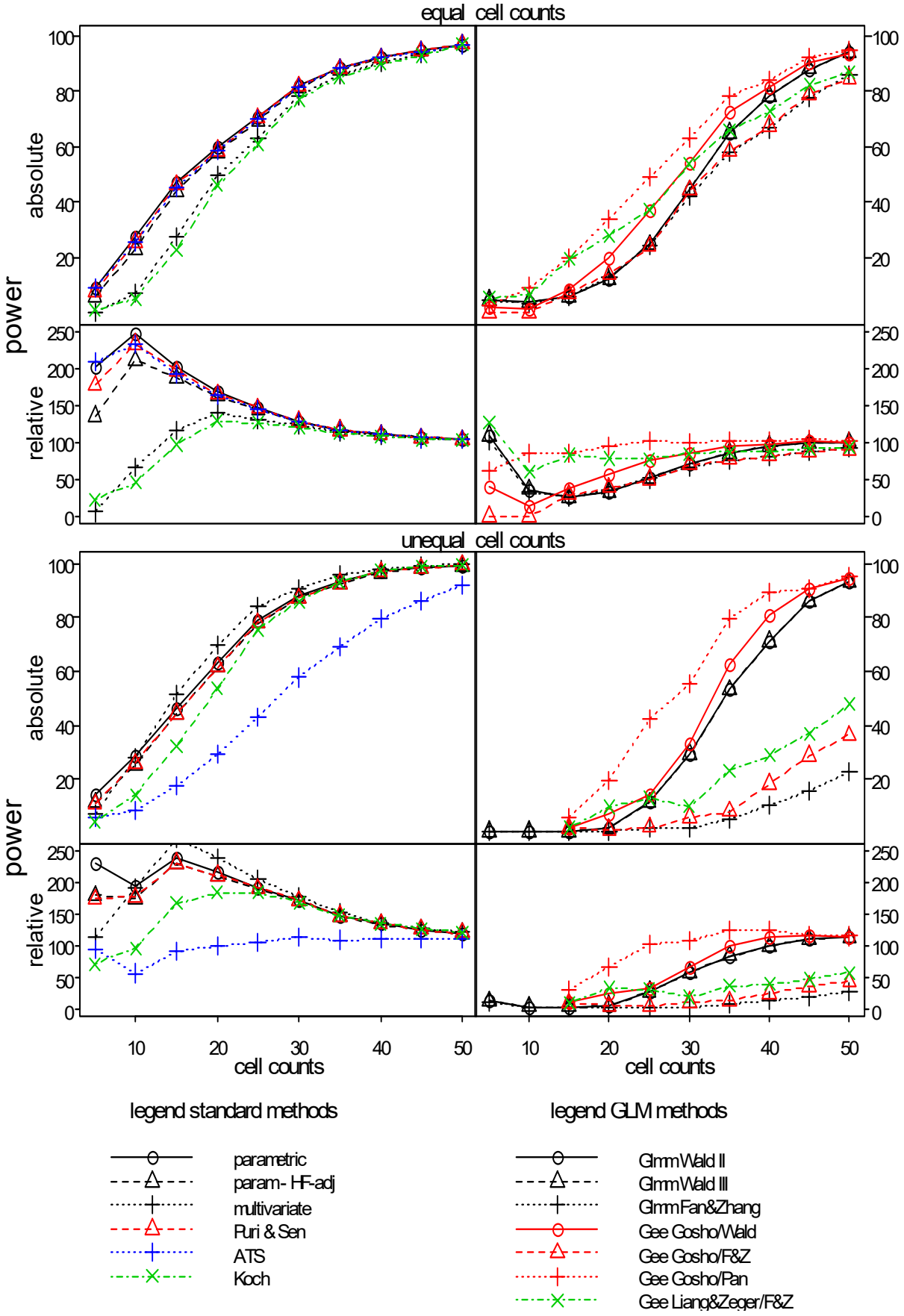
Graphic for α=0.05:



8. 3. 1. 3 p = 0.9

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	8.90	27.35	47.50	59.95	82.30	92.40	97.10	14.45	28.55	46.20	62.90	88.10	97.05	99.25
	par./ HF-corr.	5.95	23.20	44.05	57.95	81.35	92.10	97.10	11.35	25.60	44.20	61.45	87.00	96.60	99.15
	multivariate	0.25	7.40	27.45	49.90	78.40	90.65	97.05	7.25	28.00	51.70	69.50	90.75	97.75	99.65
	Puri & Sen	7.80	25.75	46.30	58.85	81.95	92.20	97.10	11.00	26.00	44.35	61.55	87.20	96.80	99.25
	ATS	9.20	25.60	45.20	58.45	81.40	92.15	97.10	6.00	8.35	17.85	29.25	57.70	79.55	91.80
	Koch	1.00	5.05	22.85	46.05	77.15	89.95	96.90	4.50	14.20	32.35	53.55	85.80	97.20	99.35
	Glmm Wald II	4.8	4.0	5.9	12.0	44.5	78.5	94.1	0.8	0.6	0.8	1.8	29.4	71.0	93.0
	Glmm Wald III	4.8	4.0	5.9	12.0	44.5	78.5	94.1	0.8	0.6	0.8	1.8	29.4	71.0	93.0
	Glmm Fan&Zhang	4.5	3.6	6.1	13.0	42.1	66.6	85.9	0.7	0.6	0.6	0.7	1.9	10.3	22.6
	Gee Gosho/Wald	1.8	1.6	8.6	20.2	54.2	81.3	93.9			2.0	6.9	33.6	81.1	94.4
	Gee Gosho/F&Z	0.0	0.0	6.9	13.9	44.3	67.5	84.7			2.0	1.4	5.9	18.3	36.2
	Gee Gosho/Pan	2.7	9.4	20.1	33.9	63.4	84.3	95.0			6.0	19.4	55.3	89.1	94.8
	Gee Liang&Zeger	5.6	6.6	19.5	28.0	53.9	72.9	87.1			2.0	9.7	9.9	28.8	47.7
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	2.25	7.35	19.75	31.15	59.05	78.60	88.60	4.85	11.25	22.05	36.20	68.25	87.95	96.15
	par./ HF-corr.	0.70	4.25	16.20	28.20	56.80	77.15	87.85	3.50	9.15	19.70	33.70	66.45	85.95	95.85
	multivariate	0.05	0.75	4.90	15.20	48.80	71.85	86.55	1.50	8.20	22.80	40.95	72.30	90.20	96.75
	Puri & Sen	0.20	5.40	17.00	28.70	57.95	77.70	88.20	2.80	9.10	19.30	33.80	67.05	87.00	95.90
	ATS	1.95	6.80	18.35	30.25	57.35	77.60	88.00	2.25	1.95	3.85	6.90	26.65	49.55	71.45
	Koch	0.85	0.30	1.95	9.25	41.45	68.00	85.25	1.80	2.65	9.00	22.05	60.45	86.90	95.60
	Glmm Wald II	4.7	3.1	3.2	4.7	13.9	45.5	75.3	0.8	0.6	0.7	0.7	8.4	38.5	74.5
	Glmm Wald III	4.7	3.1	3.2	4.7	13.9	45.5	75.3	0.8	0.6	0.7	0.7	8.4	38.5	74.5
	Glmm Fan&Zhang	4.5	2.6	3.7	5.5	17.8	42.4	64.9	0.7	0.6	0.6	0.6	0.9	2.7	5.8
	Gee Gosho/Wald	1.8	0.0	2.2	3.7	22.1	49.9	75.6			2.0	1.4	9.2	52.2	81.7
	Gee Gosho/F&Z	0.0	0.0	0.0	2.0	15.6	34.3	55.6			2.0	1.4	0.0	1.9	6.0
	Gee Gosho/Pan	1.8	1.0	3.2	7.3	29.5	56.9	79.3			2.0	4.2	23.7	66.3	85.4
	Gee Liang&Zeger	1.6	3.0	7.5	7.3	24.4	42.1	62.4			2.0	4.2	1.3	6.7	12.7

Graphic for α=0.05:

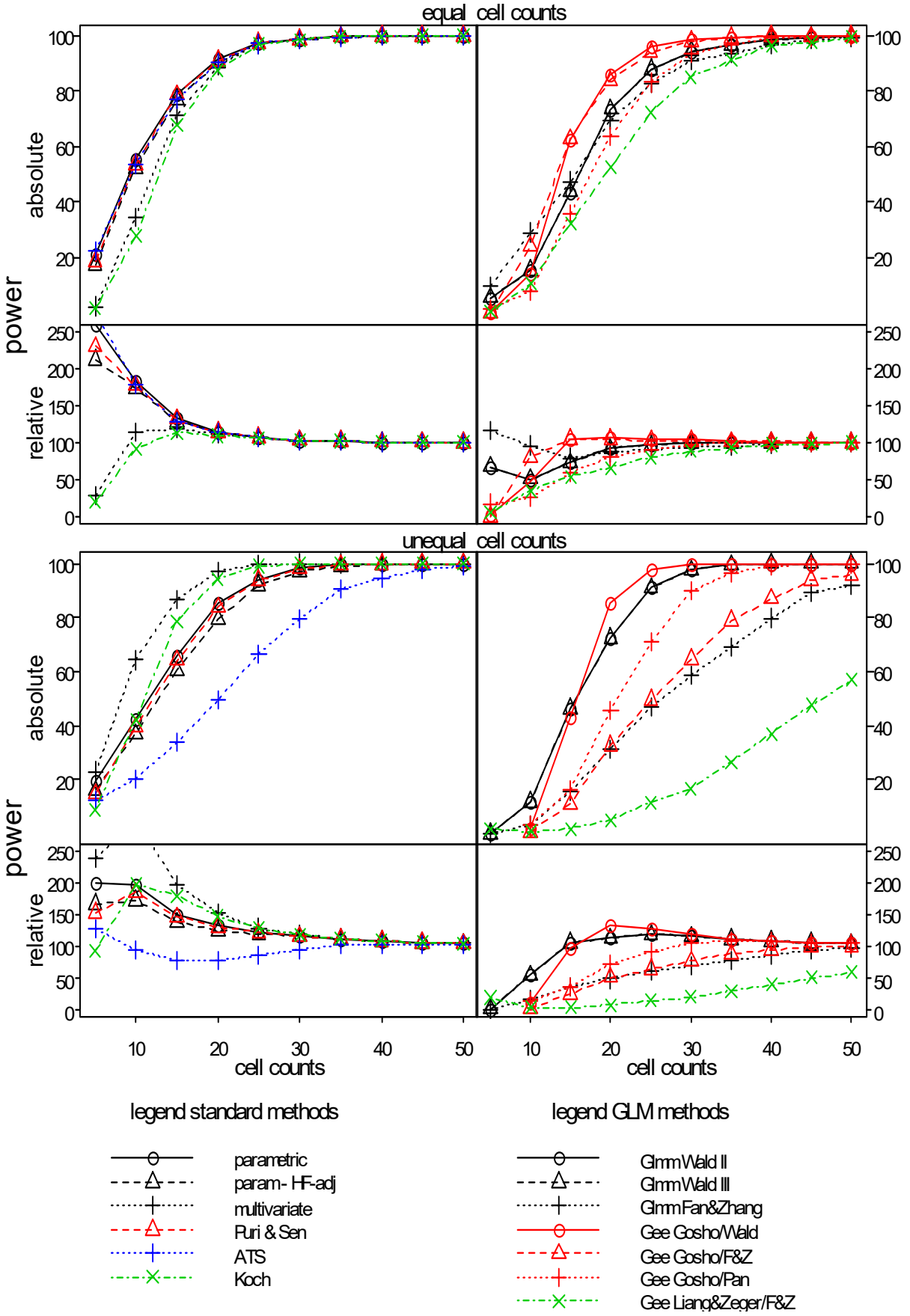


8. 3. 2. unequal correlations on B (r = 0.7, 0.5, 0.4, 0.2)

8. 3. 2. 1 p = 0.5

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	21.15	55.75	79.20	91.55	98.80	99.95	99.95	19.25	42.10	66.05	85.05	98.05	99.80	99.95
	par./ HF-corr.	17.30	52.40	77.10	90.60	98.65	99.95	99.95	16.05	37.00	60.45	79.40	97.20	99.60	99.95
	multivariate	2.35	34.45	71.45	89.20	98.70	99.95	99.95	23.10	64.20	86.75	97.05	99.95	99.95	99.95
	Puri & Sen	18.75	53.65	78.80	91.20	98.85	99.95	99.95	14.75	39.60	64.15	83.85	97.95	99.80	99.95
	ATS	22.55	53.85	77.25	90.65	98.65	99.90	99.95	12.35	20.35	34.00	49.50	79.55	94.55	99.95
	Koch	1.55	27.80	67.70	87.60	98.60	99.90	99.95	9.00	42.25	78.70	94.15	99.85	99.95	99.95
	Glmm Wald II	5.5	15.4	43.6	73.5	94.5	99.0	99.9	0.1	11.8	46.4	72.4	97.6	99.9	99.9
	Glmm Wald III	5.5	15.4	43.6	73.5	94.5	99.0	99.9	0.1	11.8	46.4	72.4	97.6	99.9	99.9
	Glmm Fan&Zhang	9.5	29.1	47.5	69.4	91.1	97.0	99.5	0.0	3.5	15.5	31.3	58.8	79.8	91.8
	Gee Gosho/Wald	0.1	14.1	62.2	85.9	99.0	99.8	100.0		2.2	42.7	85.1	99.8	100.0	100.0
	Gee Gosho/F&Z	0.0	24.2	62.8	83.9	98.2	100.0	100.0		0.5	10.9	32.7	64.4	86.9	95.7
	Gee Gosho/Pan	1.4	8.1	35.7	63.7	93.4	99.1	100.0		3.0	16.3	45.8	90.0	99.0	99.6
	Gee Liang&Zeger	0.4	10.6	32.4	52.4	85.1	96.6	99.6	1.9	0.8	1.7	5.1	16.8	36.9	57.0
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	5.60	28.75	54.60	74.90	95.00	99.45	99.95	6.55	19.60	39.90	62.20	90.80	99.05	99.70
	par./ HF-corr.	3.05	23.25	50.25	71.50	93.70	99.30	99.9	4.55	15.10	32.40	51.50	85.40	97.70	99.55
	multivariate	0.45	7.65	34.95	64.15	93.65	99.00	99.9	6.90	35.85	67.90	87.40	99.05	99.95	99.95
	Puri & Sen	2.85	23.60	51.70	73.35	94.45	99.40	99.9	3.55	16.40	36.70	59.25	90.10	99.05	99.65
	ATS	7.10	27.70	51.90	72.15	93.75	99.35	99.9	4.75	7.35	12.50	20.25	48.00	77.25	91.40
	Koch	1.05	1.80	21.85	54.25	91.50	98.75	99.9	1.85	12.20	44.45	76.40	98.50	99.90	99.95
	Glmm Wald II	1.0	4.2	9.5	35.2	78.1	94.4	98.7	0.1	2.6	17.7	40.9	86.2	98.7	99.7
	Glmm Wald III	1.0	4.2	9.5	35.2	78.1	94.4	98.7	0.1	2.6	17.7	40.9	86.2	98.7	99.7
	Glmm Fan&Zhang	3.0	7.4	17.7	38.1	70.1	87.9	95.9	0.0	0.5	4.5	10.8	27.9	49.9	71.9
	Gee Gosho/Wald	0.1	1.6	24.6	58.0	93.6	99.2	100.0		0.4	15.6	60.1	96.8	99.9	100.0
	Gee Gosho/F&Z	0.0	2.3	30.2	57.7	90.2	98.7	99.9		0.0	1.6	10.6	35.1	64.4	84.2
	Gee Gosho/Pan	0.2	1.1	9.5	29.7	75.1	93.7	99.0		0.4	4.2	19.9	70.2	95.8	99.0
	Gee Liang&Zeger	0.3	0.2	5.8	16.8	53.7	77.2	93.4	1.9	0.1	0.0	0.5	2.4	10.3	23.7

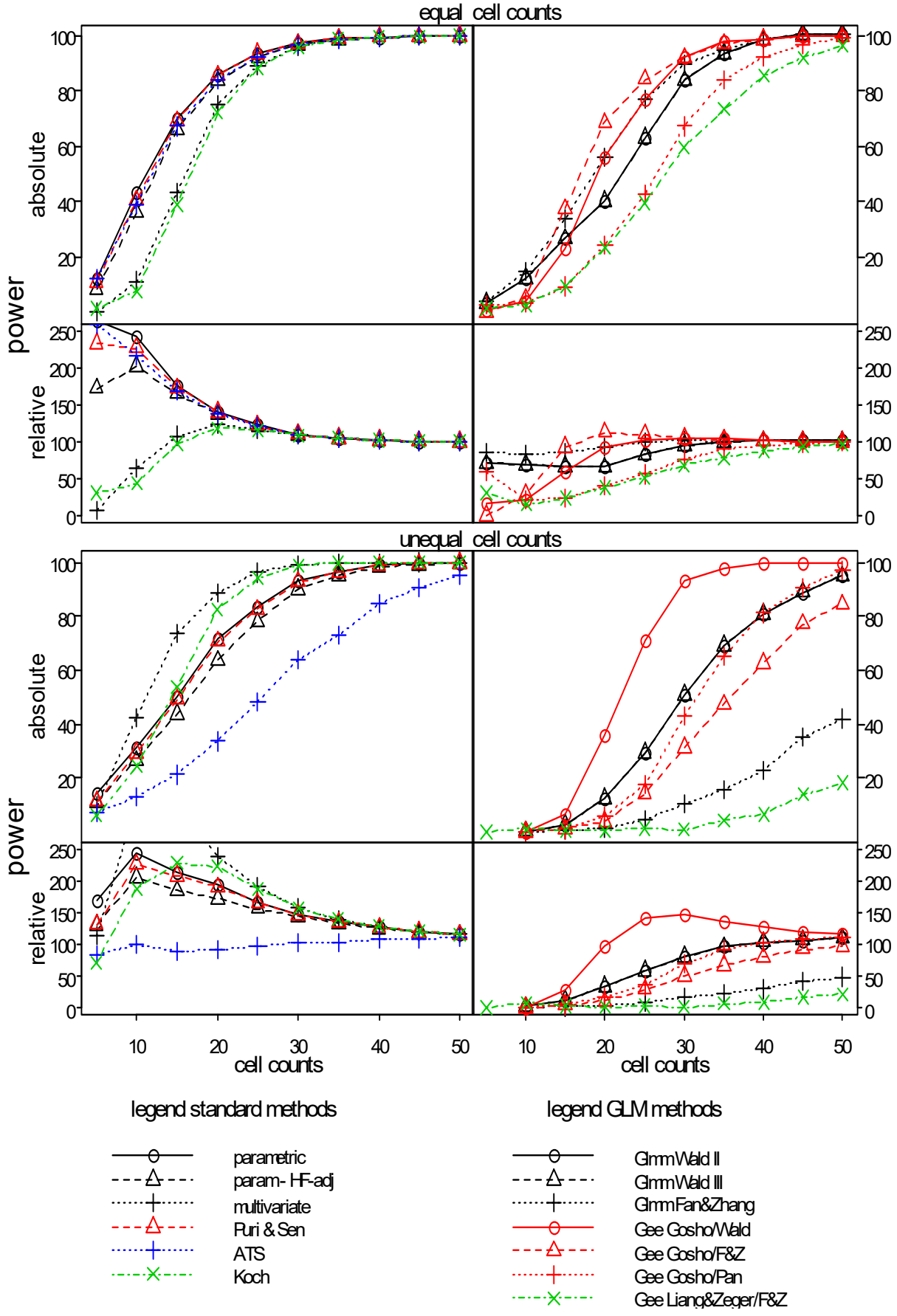
Graphic for α=0.05:



8. 3. 2. 2 p = 0.8

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	12.50	43.30	70.30	86.00	97.25	99.60	99.95	14.55	31.50	50.30	71.65	93.05	99.00	99.80
	par./ HF-corr.	8.15	36.05	66.10	83.75	96.85	99.55	99.95	11.25	26.65	43.80	63.75	90.00	98.05	99.75
	multivariate	0.35	11.25	43.30	74.95	96.30	99.65	99.95	9.85	42.15	73.65	88.70	98.90	99.90	99.95
	Puri & Sen	11.05	40.45	69.35	85.75	97.15	99.60	99.95	11.30	29.35	49.10	70.60	92.80	98.95	99.80
	ATS	12.30	38.70	67.30	84.05	96.80	99.50	99.95	7.10	13.10	21.20	33.60	63.90	84.90	95.20
	Koch	1.45	7.70	38.95	72.20	95.90	99.55	99.95	6.15	24.40	53.85	82.55	98.80	99.95	99.95
	Glmm Wald II	3.3	12.2	26.6	40.3	84.0	98.6	100.0		0.3	2.8	12.5	50.8	80.9	95.0
	Glmm Wald III	3.3	12.2	26.6	40.3	84.0	98.6	100.0		0.3	2.8	12.5	50.8	80.9	95.0
	Glmm Fan&Zhang	4.0	14.8	33.9	56.1	90.1	99.0	100.0		0.1	0.4	1.1	10.6	22.9	42.0
	Gee Gosho/Wald	0.8	3.9	23.4	56.2	92.6	99.0	99.9		0.0	6.5	35.6	93.3	99.6	100.0
	Gee Gosho/F&Z	0.0	5.0	37.4	68.7	92.1	98.7	99.9		0.0	1.0	3.9	31.4	62.5	84.4
	Gee Gosho/Pan	2.8	3.7	9.4	24.2	67.3	92.3	99.1		0.0	1.0	6.0	43.1	81.1	96.9
	Gee Liang&Zeger	1.4	2.6	9.4	23.2	59.7	85.6	96.4	0.0	1.0	0.7	0.3	0.9	6.6	18.3
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	3.10	15.30	39.35	63.20	89.65	97.80	99.75	4.95	12.40	24.55	42.40	78.70	93.15	99.15
	par./ HF-corr.	1.05	8.45	30.45	55.85	86.90	96.85	99.60	2.70	7.95	18.25	33.50	69.35	89.00	97.90
	multivariate	0.05	0.85	9.45	33.35	81.90	96.90	99.65	2.20	16.40	41.60	68.90	94.35	99.55	99.95
	Puri & Sen	1.10	12.55	35.45	59.75	89.05	97.60	99.75	2.80	9.65	22.35	40.00	77.25	92.90	99.15
	ATS	2.85	12.90	34.45	58.35	87.40	96.90	99.60	3.30	2.95	5.60	11.95	30.85	51.20	76.20
	Koch	1.40	0.95	4.70	21.70	75.90	95.50	99.55	2.50	4.85	19.55	48.05	90.45	99.15	99.95
	Glmm Wald II	2.6	6.3	9.6	12.8	45.3	84.5	98.6		0.3	2.8	12.5	50.8	80.9	95.0
	Glmm Wald III	2.6	6.3	9.6	12.8	45.3	84.5	98.6		0.3	2.8	12.5	50.8	80.9	95.0
	Glmm Fan&Zhang	2.7	7.0	15.0	22.3	61.3	91.1	99.95		0.1	0.0	0.0	10.6	22.9	42.0
	Gee Gosho/Wald	0.4	0.5	4.2	17.5	66.6	93.0	99.2		0.0	1.7	8.7	70.5	97.0	100.0
	Gee Gosho/F&Z	0.0	0.1	7.0	27.7	72.4	92.8	98.9		0.0	0.0	0.0	6.2	24.6	51.5
	Gee Gosho/Pan	2.4	0.3	1.5	3.3	27.8	68.9	91.0		0.0	0.3	1.0	14.5	54.7	87.9
	Gee Liang&Zeger	1.4	0.6	0.5	1.5	15.0	44.3	72.6	0.0	1.0	0.7	0.2	0.0	0.9	1.5

Graphic for α=0.05:



8. 3. 2. 3 p = 0.9

		equal cell counts							unequal cell counts						
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.05	parametric	6.15	28.45	53.85	71.30	92.90	98.50	99.8	12.80	25.75	41.85	57.00	84.05	95.60	99.45
	par./ HF-corr.	3.35	19.60	45.35	66.55	91.10	97.85	99.7	8.60	20.95	35.10	51.15	79.40	93.35	98.70
	multivariate	0.15	2.90	17.00	41.60	83.55	96.90	99.4	4.55	24.15	50.15	70.60	92.60	99.00	99.95
	Puri & Sen	5.35	26.40	52.85	71.10	92.75	98.35	99.8	9.70	23.05	39.35	55.30	83.25	95.55	99.35
	ATS	6.00	23.20	49.05	67.55	91.25	97.80	99.7	4.25	7.70	13.75	22.80	48.20	69.55	87.65
	Koch	0.90	2.80	15.15	39.40	82.70	96.45	99.5	5.65	14.25	31.15	55.90	90.20	98.70	99.95
	Glmm Wald II		6.1	11.4	19.0	43.2	73.6	92.3		0.1	0.1	2.3	27.8	69.8	91.9
	Glmm Wald III		6.1	11.4	19.0	43.2	73.6	92.3		0.1	0.1	2.3	27.8	69.8	91.9
	Glmm Fan&Zhang		5.2	13.3	23.9	51.0	78.1	92.7		0.0	0.0	0.6	3.0	11.2	25.0
	Gee Gosho/Wald	2.2	1.4	9.8	24.8	68.8	92.0	98.5		0.0	2.9	9.8	52.8	92.2	98.0
	Gee Gosho/F&Z	0.0	1.0	16.3	38.1	78.7	94.5	98.7		0.0	0.0	1.9	8.5	29.7	52.5
	Gee Gosho/Pan	8.0	4.8	4.0	7.1	28.2	63.6	86.0		0.0	0.0	0.7	6.0	26.9	65.5
	Gee Liang&Zeger	0.9	0.8	2.2	6.3	27.1	53.0	76.8		0.0	0.0	0.6	0.9	0.7	2.9
α	method	5	10	15	20	30	40	50	5	10	15	20	30	40	50
0.01	parametric	1.30	6.90	21.60	39.55	74.20	91.05	98.00	4.40	9.90	17.75	31.35	61.50	83.00	95.25
	par./ HF-corr.	0.15	2.45	13.05	29.10	67.55	88.05	96.80	2.30	6.85	12.00	24.65	52.50	75.45	92.65
	multivariate	0.05	0.30	2.00	8.20	46.20	78.75	95.55	1.05	7.35	22.10	40.55	76.95	94.45	98.95
	Puri & Sen	0.15	5.65	19.30	36.25	72.75	90.60	97.95	2.45	8.00	14.70	28.70	59.30	81.90	95.10
	ATS	1.60	5.40	16.30	32.40	68.70	88.40	97.00	1.65	1.60	1.95	5.75	16.95	33.45	57.95
	Koch	0.90	0.85	1.90	5.00	38.35	74.95	94.65	3.40	3.90	8.15	21.15	63.80	90.50	98.70
	Glmm Wald II		6.1	11.4	19.0	43.2	73.6	92.3		0.1	0.1	0.5	7.8	36.3	68.0
	Glmm Wald III		6.1	11.4	19.0	43.2	73.6	92.3		0.1	0.1	0.5	7.8	36.3	68.0
	Glmm Fan&Zhang		5.2	13.3	23.9	51.0	78.1	92.7		0.0	0.0	0.3	0.4	2.2	5.6
	Gee Gosho/Wald	2.2	0.3	1.4	3.4	25.8	63.8	88.0		0.0	0.0	1.3	22.6	65.8	93.4
	Gee Gosho/F&Z	0.0	0.0	1.3	7.5	42.1	71.0	89.5		0.0	0.0	0.0	0.9	5.7	12.9
	Gee Gosho/Pan	7.6	0.8	0.8	1.1	5.7	22.9	50.8		0.0	0.0	0.0	1.3	7.8	34.1
	Gee Liang&Zeger	0.9	0.3	0.1	0.1	2.2	12.1	27.6		0.0	0.0	0.6	0.4	0.0	0.3

Graphic for α=0.05: