

ANALYSIS OF VARIANCE WITH STRUCTURAL ZEROES

Table 2.2: SAS's Parameter Estimates

	True Value	Horiz. Refer.	R1,R2 Flip	R3,R4 switch	R3,R4 switch
	Parameter Estimates				
μ	5	9.96	4.54	9.96	6.81
α_1	-2	-2.55	0.00	-5.56	-2.55
α_2	-1	-3.50	-0.94	-2.60	-3.50
α_3	1	-2.87	2.56	-2.87	1.29
α_4	2	0.00	5.42	0.00	0.00
β_1	-2	-4.38	-4.52	-4.38	-1.22
β_2	-1	-4.52	-1.65	-4.52	-1.37
β_3	1	-3.16	1.00	-3.16	0.00
β_4	2	0.00	0.00	0.00	3.16
$\alpha\beta_{11}$	-1	-3.01	0.00	0.00	-3.01
$\alpha\beta_{12}$	1	0.00	0.00	3.01	0.00
$\alpha\beta_{21}$	1	0.89	3.90	0.00	0.89
$\alpha\beta_{22}$	-1	0.00	0.00	-0.89	0.00
$\alpha\beta_{31}$	-.5	0.76	0.90	0.76	-3.40
$\alpha\beta_{32}$.5	2.87	0.00	2.87	-1.29
$\alpha\beta_{33}$	1	4.16	0.00	4.16	0.00
$\alpha\beta_{34}$	-1	0.00	0.00	0.00	-4.16
$\alpha\beta_{41}$.5	0.00	0.14	0.00	0.00
$\alpha\beta_{42}$	-.5	0.00	-2.87	0.00	0.00
$\alpha\beta_{43}$	-1	0.00	-4.16	0.00	0.00

now different as a result of the missing cells, we will need to impose additional constraints to keep the design matrix X nonsingular. Using Figure 1.2, we see that we do not need to adjust the constraints for the main

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