

1 Numerical Result

Table 1: Test for variable selection

Method	CFR (%)	CFR2 (%)	OFR (%)	AN	CFR (%)	CFR2 (%)	OFR (%)	AN
Case A					Case B			
PAWLS-AIC	0	0	80	87.6	0	0	100	97.2
PAWLS-BIC	60	100	40	10.4	100	100	0	10
APAWLS-AIC	80	100	20	10.2	80	80	0	8.2
APAWLS-BIC	80	100	20	10.2	80	80	0	8.2
Case C					Case D			
PAWLS-AIC	0	0	60	79	0	0	80	86
PAWLS-BIC	80	80	0	10	60	60	20	10.6
APAWLS-AIC	100	100	0	10	100	100	0	10
APAWLS-BIC	100	100	0	10	100	100	0	10
Case E								
PAWLS-AIC	0	0	40	76.4				
PAWLS-BIC	20	40	20	13.8				
APAWLS-AIC	20	20	0	7.4				
APAWLS-BIC	20	20	0	8				

Table 2: Test for outlier detection

		AIC			BIC		
	Model	M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
PAWLS	Case A	0	0.1	1	0	0	1
	Case B	0	0	1	0	0.01	1
	Case C	0.08	0.1	0.6	0	0	1
	Case D	0.1	0.03	0.4	0.16	0	0.8
	Case E	0.46	0.18	0	0.44	0.01	0
APAWLS	Case A	0	0	1	0	0	1
	Case B	0	0.15	1	0	0.15	1
	Case C	0	0.01	1	0	0	1
	Case D	0	0.01	1	0	0	1
	Case E	0.24	0.11	0	0.3	0.02	0

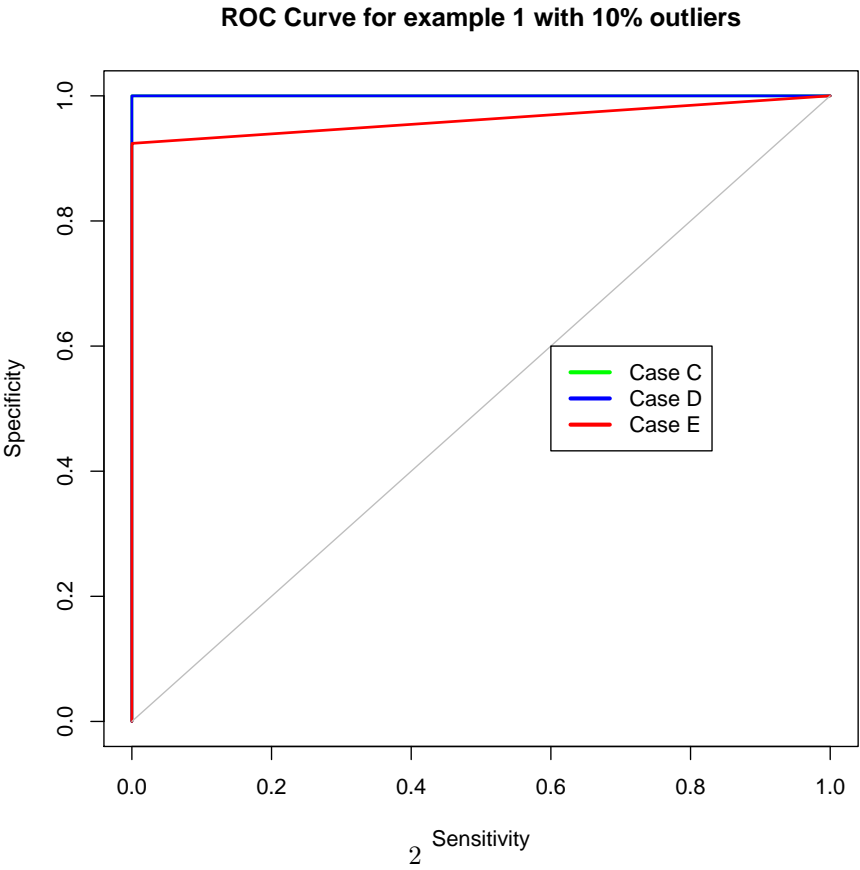


Table 3: Variable Selection Results for Example 1 ($\beta = (3, 2, 1.5, 0, 0, 0, 0, 0)'$ with 10% outliers)

Method	CFR (%)	OFR (%)	AN	TIME	CFR (%)	OFR (%)	AN	TIME
Case A				Case B				
ALasso	74	23	3.29	0.9	63	25	3.25	0.97
sLTS	10	89	4.89	4.3	24	76	4.21	4.1
MMNNG	68	25	3.25	691.33	88	12	3.13	682.07
SROS	19	78	4.34	49.36	30	70	4.12	53.2
PAWLS	38	56	3.68	13.87	64	36	3.42	13.39
APAWLS	61	28	3.28	28.01	90	10	3.1	28.05
Case C				Case D				
ALasso	3	2	1.94	0.85	0	19	2.52	1.19
sLTS	7	93	5.06	4.09	11	89	4.98	4.38
MMNNG	72	12	2.95	673.93	63	16	3.25	682.47
SROS	50	42	3.57	49.32	3	84	4.9	49.3
PAWLS	52	44	3.64	14.72	98	0	2.98	16.07
APAWLS	74	20	3.19	29.63	97	0	2.97	30.63
Case E								
ALasso	0	17	4.05	0.98				
sLTS	5	95	5.07	4.2				
MMNNG	79	12	3.08	484.67				
PAWLS	58	38	3.43	15.58				
APAWLS	79	14	3.09	30.47				

Table 4: Variable Selection Results for Example 1 ($\beta = (3, 2, 1.5, 0, 0, 0, 0, 0)'$ with 20% outliers)

Method	CFR (%)	OFR (%)	AN	TIME	CFR (%)	OFR (%)	AN	TIME
Case C					Case D			
ALasso	1	2	1.22	1.03	1	4	1.68	1.57
sLTS	1	99	5.49	4.31	4	95	5.35	4.3
MMNNG	65	5	2.76	470.24	31	33	3.96	473.42
PAWLS	47	49	3.65	14.92	95	0	2.97	17.41
PAWLS	79	7	2.93	16.05	89	0	2.91	18.4
Case E								
ALasso	0	12	2.73	0.98				
sLTS	5	94	5.2	4.27				
MMNNG	56	6	2.72	457.01				
PAWLS	66	21	3.14	15.29				
APAWLS	59	3	2.66	16.6				

Table 5: Variable Selection Results for Example 1 ($\beta = (3, 2, 1.5, 0, 0, 0, 0, 0)'$ with 30% outliers)

Method	CFR (%)	OFR (%)	AN	TIME	CFR (%)	OFR (%)	AN	TIME
Case C					Case D			
ALasso	2	0	0.68	1	0	3	0.96	1.75
sLTS	2	97	5.58	4.42	5	91	5.61	4.43
MMNNG	38	1	2.3	465.41	5	41	4.29	477.06
PAWLS	45	47	3.5	15.63	93	0	2.93	18.69
APAWLS	78	7	2.93	16.08	86	0	2.86	18.84
Case E								
ALasso	1	8	2.25	0.97				
sLTS	8	91	5.11	4.2				
MMNNG	26	8	2.43	459.79				
PAWLS	62	17	3.02	15.72				
PAWLS	43	0	2.35	17.27				

Table 6: Variable Selection Results for Example 2 ($\beta = (\mathbf{2}'_{10}, \mathbf{0}'_{p-10})'$ with 10% outliers

Method	CFR (%)	OFR (%)	AN	TIME	CFR (%)	OFR (%)	AN	TIME
Case A					Case B			
ALasso	97	0	9.96	3.4	84	1	9.75	3.41
sLTS	0	78	31.9	1702.93	1	86	24.93	1630.7
PAWLS	6	94	15.65	342.9	5	95	14.29	350.42
APAWLS	94	1	9.89	380.82	91	0	9.5	402.73
Case C					Case D			
ALasso	0	0	6.25	4.07	0	1	6.89	4.07
sLTS	0	91	32.11	1942.99	0	92	31.98	1870.57
PAWLS	3	96	16.12	515.17	3	96	16.19	481.7
APAWLS	85	0	9.84	549.88	85	0	9.84	517.15
Case E								
ALasso	0	0	12.18	4.06				
sLTS	0	92	30.96	1830.16				
PAWLS	2	67	22.23	543.52				
APAWLS	31	0	8.32	595.09				

Table 7: Variable Selection Results for Example 2 ($\beta = (\mathbf{2}'_{10}, \mathbf{0}'_{p-10})'$ with 20% outliers

Method	CFR (%)	OFR (%)	AN	TIME	CFR (%)	OFR (%)	AN	TIME
Case C					Case D			
ALasso	0	0	5.7	6.45	0	0	6.15	6.89
sLTS	0	98	32.24	3138.03	0	98	32.21	2997.23
PAWLS	1	98	16.67	634.72	1	98	17.23	576.92
APAWLS	79	0	9.6	655.74	82	0	9.73	613.54
Case E								
ALasso	0	0	17.41	6.3				
sLTS	0	76	34	2852.83				
PAWLS	0	19	27.36	614.72				
APAWLS	3	0	7.62	677.3				

Table 8: Variable Selection Results for Example 2 ($\beta = (\mathbf{2}'_{10}, \mathbf{0}'_{p-10})'$ with 30% outliers

Method	CFR (%)	OFR (%)	AN	TIME	CFR (%)	OFR (%)	AN	TIME
Case C				Case D				
ALasso	0	0	6.26	7.26	0	0	7.03	7.28
sLTS	0	2	56.47	3177.43	0	69	40.49	3135
PAWLS	5	80	17.36	689.51	3	88	17.81	653.34
APAWLS	40	0	8.94	723.47	40	3	8.94	682.85
Case E								
ALasso	0	0	17.89	6.67				
sLTS	0	17	42.75	2960.74				
PAWLS	0	0	26.66	633.4				
APAWLS	0	0	8.14	669.79				

Table 9: Outlier Detection Evaluation in Example 1 and 2 with 10% outliers

		sLTS			PAWLS		
	Model	M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
Example 1	Case A	0	0.05	1	0	0.05	1
	Case B	0	0.08	1	0	0.06	1
	Case C	0	0	1	0	0	1
	Case D	0	0	1	0	2.22×10^{-4}	1
	Case E	0.03	0	0.87	0.08	2.22×10^{-4}	0.71
Example 2	Case A	0	0.21	1	0	0.01	1
	Case B	0	0.16	1	0	0.06	1
	Case C	0	0.13	0.99	0	0.01	1
	Case D	0	0.14	0.99	0	0.01	1
	Case E	0.08	0.12	0.42	0.3	0.02	0.03

Table 10: Outlier Detection Evaluation in Example 1 and 2 with 20% outliers

	Model	sLTS			PAWLS		
		M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
Example 1	Case C	0	5×10^{-4}	1	0	2.5×10^{-4}	1
	Case D	0.02	0	0.95	0.01	2.5×10^{-4}	0.99
	Case E	0.02	0	0.81	0.11	2.5×10^{-4}	0.35
Example 2	Case C	0	0.05	1	0	0.01	0.99
	Case D	0	0.05	0.99	0.01	0.01	0.98
	Case E	0.18	0.07	0	0.45	0.07	0

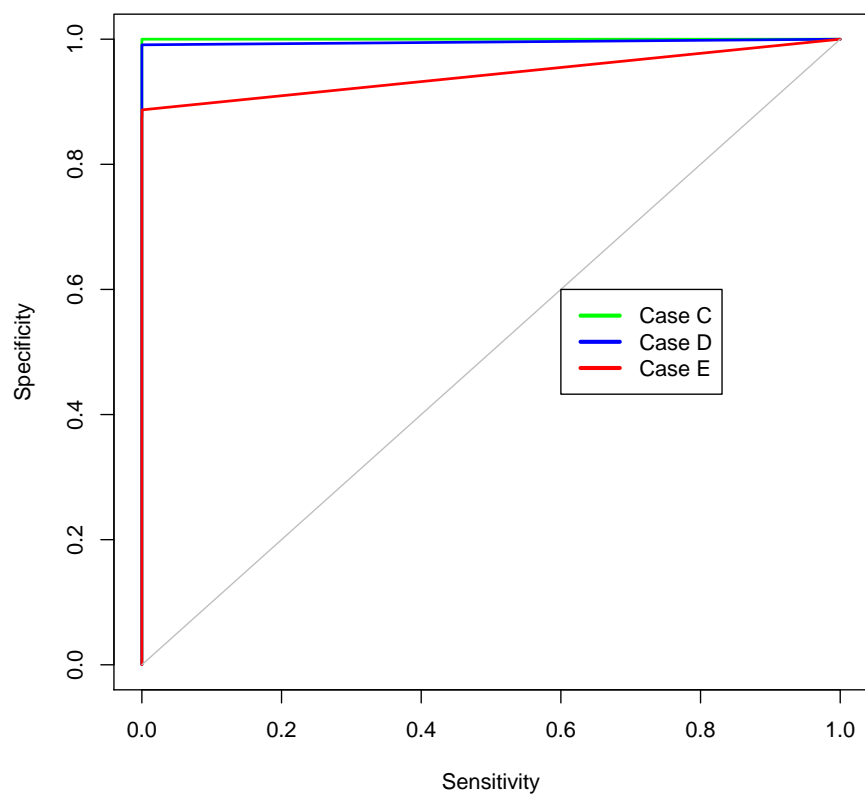
Table 11: Outlier Detection Evaluation in Example 1 and 2 with 30% outliers

	Model	sLTS			PAWLS		
		M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
Example 1	Case C	0	0	1	0	0	1
	Case D	0.07	0.01	0.81	0	0	1
	Case E	0.04	2.86×10^{-4}	0.63	0.12	5.71×10^{-4}	0.26
Example 2	Case C	0.25	0.04	0	0.02	0.02	0.87
	Case D	0.32	0.06	0	0.05	0.01	0.86
	Case E	0.35	0.06	0	0.53	0.11	0

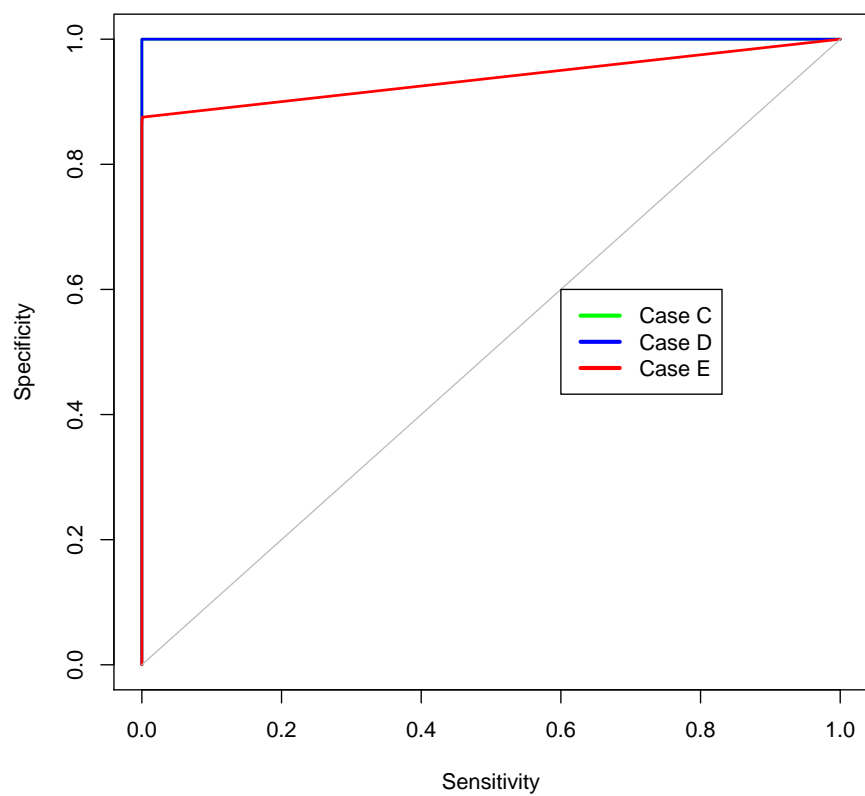
Table 12: Outlier Detection Evaluation in Example 1

	Model	IPOD			PAWLS		
		M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
Example 1	Case A	0	0	1	0	0.05	1
	Case B	0	0.1	1	0	0.06	1
	Case C	0	0.08	1	0	0	1
	Case D	0.49	0.02	0.07	0	2.22×10^{-4}	1
	Case E	0.22	0.05	0.31	0.08	2.22×10^{-4}	0.71

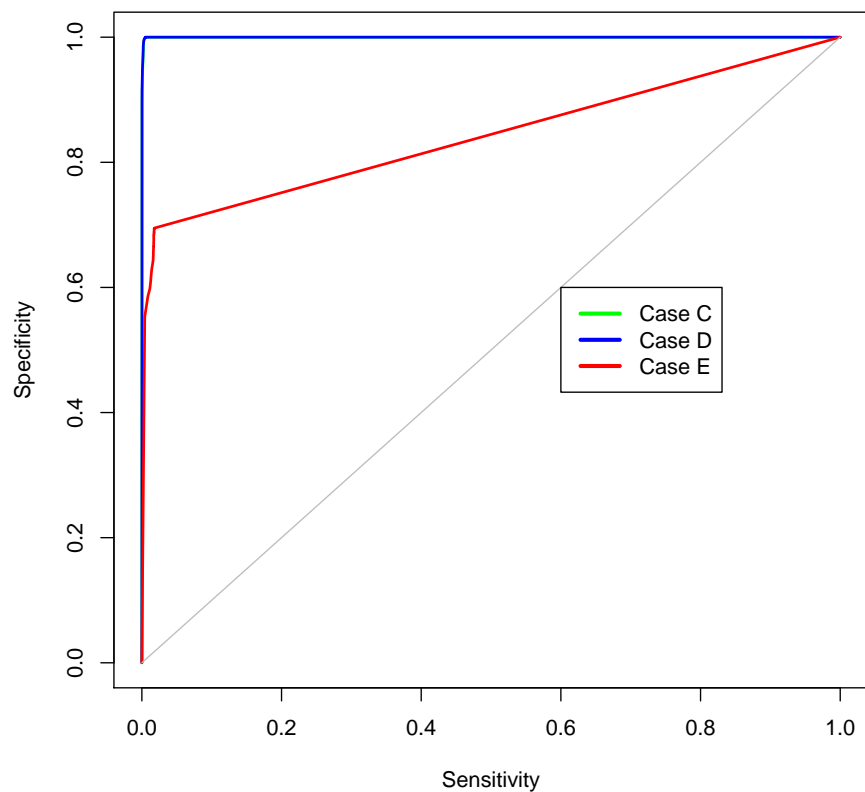
ROC Curve for example 1 with 20% outliers



ROC Curve for example 1 with 30% outliers



ROC Curve for example 2 with 10% outliers



ROC Curve for example 2 with 20% outliers

