1 Numerical Result

Table 1: 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	39	60	3.96	0.82	44	56	3.95	0.78
APAWLS	74	11	2.9	2.17	77	3	2.58	3.01
		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	48	3.83	0.68	87	12	3.35	1.07
APAWLS	72	14	2.84	2.34	89	2	2.9	2.97
		Case E						
ALasso	0	17	4.05	0.98				
sLTS	5	95	5.07	4.2				
MMNNG	79	12	3.08	484.67				
PAWLS	50	50	3.79	0.76				
APAWLS	63	7	2.45	2.23				

Table 2: 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	43	56	3.9	0.68	66	32	4.13	1.25
PAWLS	73	7	2.67	2.78	88	1	2.87	3.67
		Case E						
ALasso	0	12	2.73	0.98				
sLTS	5	94	5.2	4.27				
MMNNG	56	6	2.72	457.01				
PAWLS	44	39	3.54	1.24				
APAWLS	49	3	2.2	2.5				

Table 3: 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	50	47	3.77	0.8	36	63	5.43	1.42
APAWLS	76	7	2.86	2.87	89	0	2.87	3.99
		Case E						
ALasso	1	8	2.25	0.97				
sLTS	8	91	5.11	4.2				
MMNNG	26	8	2.43	459.79				
PAWLS	28	38	3.48	1.56				
PAWLS	32	3	2.07	2.74				

Table 4: 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	2	98	30.83	38.38	12	88	18.12	36.85
APAWLS	71	19	9.52	197.74	76	3	8.15	215.55
		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	6	86	19.79	76.68	9	77	30.06	78.49
APAWLS	62	16	8.54	231.28	65	14	8.67	240.65
		Case E						
ALasso	0	0	12.18	4.06				
sLTS	0	92	30.96	1830.16				
PAWLS	0	79	76.74	122.89				
APAWLS	23	13	6.47	249.22				

Table 5: 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	7	52	46.41	155.78	8	56	51.72	138.95
APAWLS	60	6	7.56	257.45	53	8	7.29	267.92
		Case E						
ALasso	0	0	17.41	6.3				
sLTS	0	76	34	2852.83				
PAWLS	0	39	87.43	132.7				
APAWLS	3	4	5.57	287.92				

Table 6: 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	0	8	89.68	210.68	0	29	80.26	196.42
APAWLS	23	3	5.28	290.77	21	14	6.65	301.11
		Case E						
ALasso	0	0	17.89	6.67				
sLTS	0	17	42.75	2960.74				
PAWLS	0	12	89.01	155.62				
APAWLS	0	0	3.33	291.39				

Table 7: 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	0.06	1
	Case B	0	0.08	1	0	0.06	1
	Case C	0	0	1	0.01	0.01	0.99
	Case D	0	0	1	0.01	0	0.97
	Case E	0.03	0	0.87	0.05	0.01	0.79
Example 2	Case A	0	0.21	1	0	0.04	1
	Case B	0	0.16	1	0	0.09	1
	Case C	0	0.13	0.99	0.02	0.05	0.88
	Case D	0	0.14	0.99	0.02	0.05	0.88
	Case E	0.08	0.12	0.42	0.29	0.12	0.07

Table 8: Outlier Detection Evaluation in Example 1 and 2 with 20% outliers

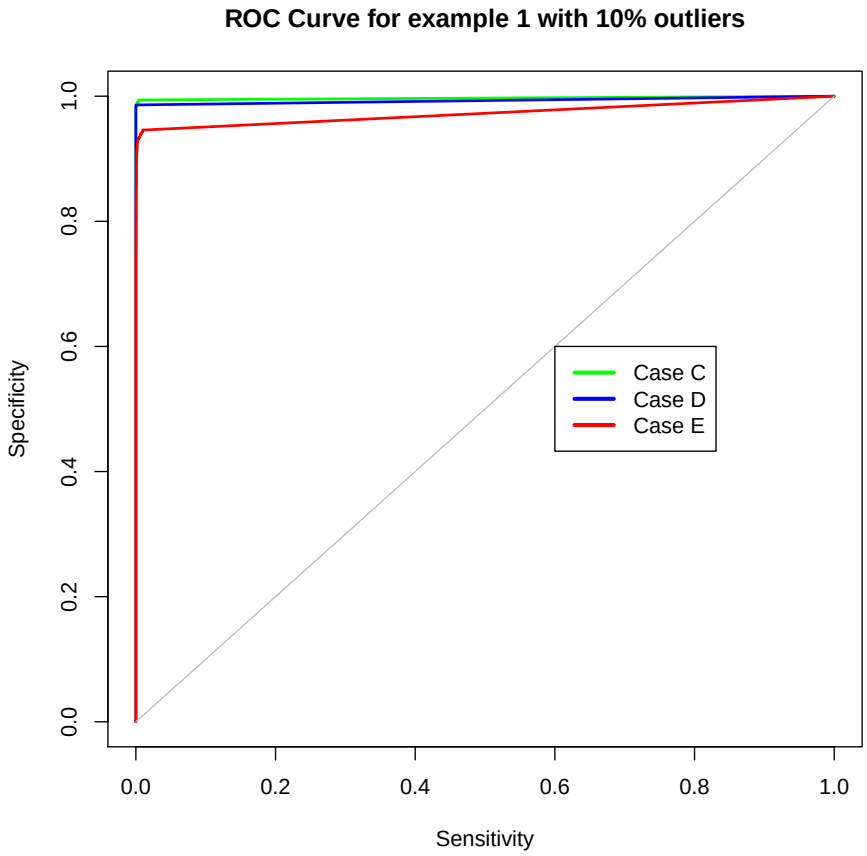
		sLTS			PAWLS		
	Model	M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
Example 1	Case C	0	5×10^{-4}	1	0	0.01	1
	Case D	0.02	0	0.95	0	7.5×10^{-4}	0.99
	Case E	0.02	0	0.81	0.08	0.02	0.45
Example 2	Case C	0	0.05	1	0.04	0.07	0.67
	Case D	0	0.05	0.99	0.07	0.08	0.57
	Case E	0.18	0.07	0	0.35	0.12	0

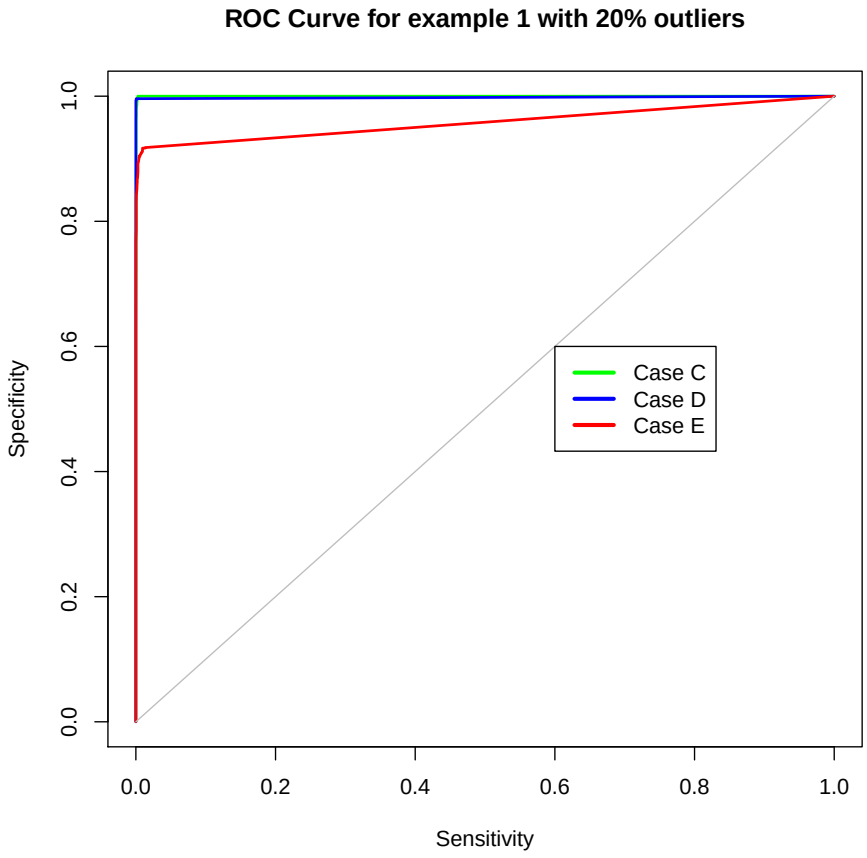
Table 9: Outlier Detection Evaluation in Example 1 and 2 with 30% outliers

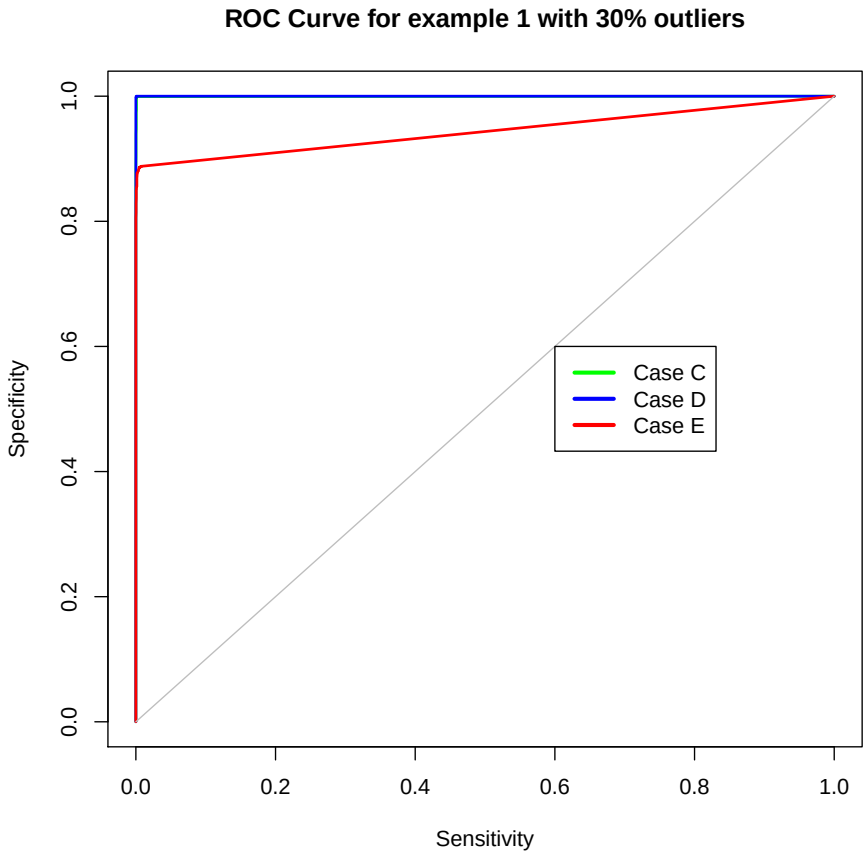
		sLTS			PAWLS		
	Model	M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
Example 1	Case C	0	0	1	6.67×10^{-4}	0	0.99
	Case D	0.07	0.01	0.81	0	5.71×10^{-4}	1
	Case E	0.04	2.86×10^{-4}	0.63	0.11	0.01	0.31
Example 2	Case C	0.25	0.04	0	0.09	0.1	0.36
	Case D	0.32	0.06	0	0.15	0.08	0.33
	Case E	0.35	0.06	0	0.32	0.14	0

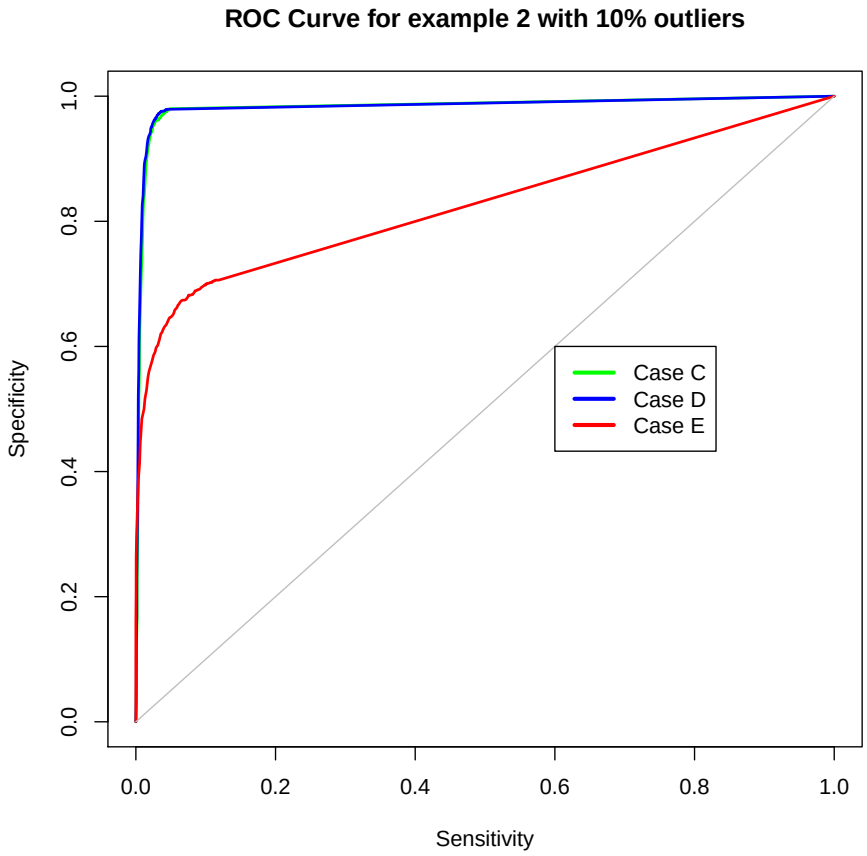
Table 10: Outlier Detection Evaluation in Example 1

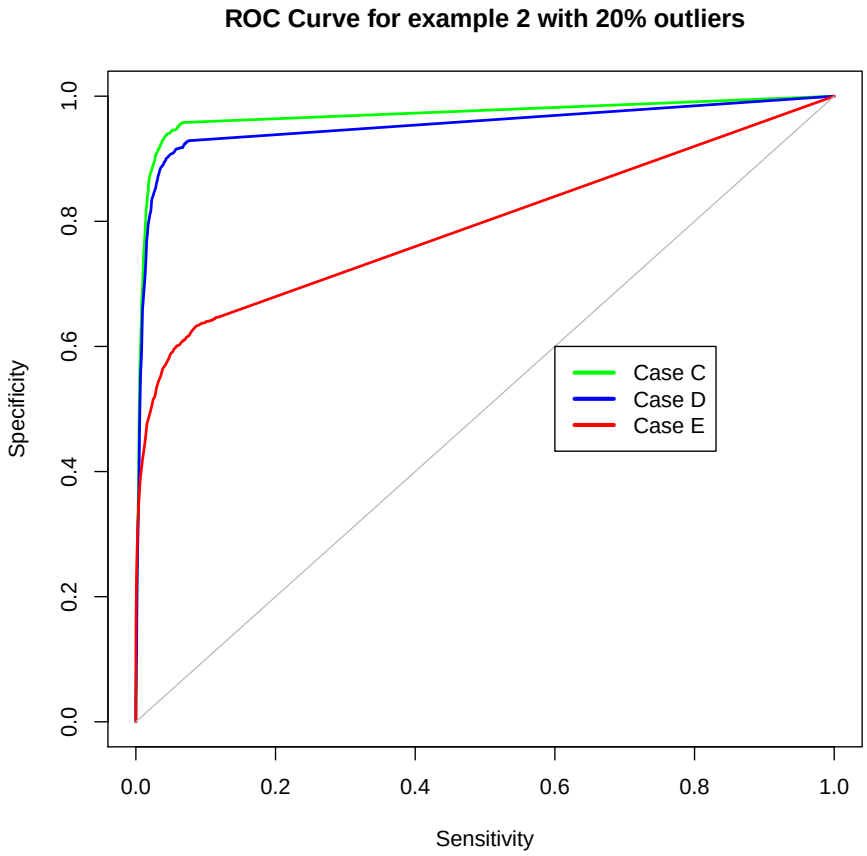
		IPOD			PAWLS		
	Model	M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
Example 1	Case A	0	0	1	0	0.06	1
	Case B	0	0.1	1	0	0.06	1
	Case C	0	0.08	1	0.01	0.01	0.99
	Case D	0.49	0.02	0.07	0.01	0	0.97
	Case E	0.22	0.05	0.31	0.05	0.01	0.79

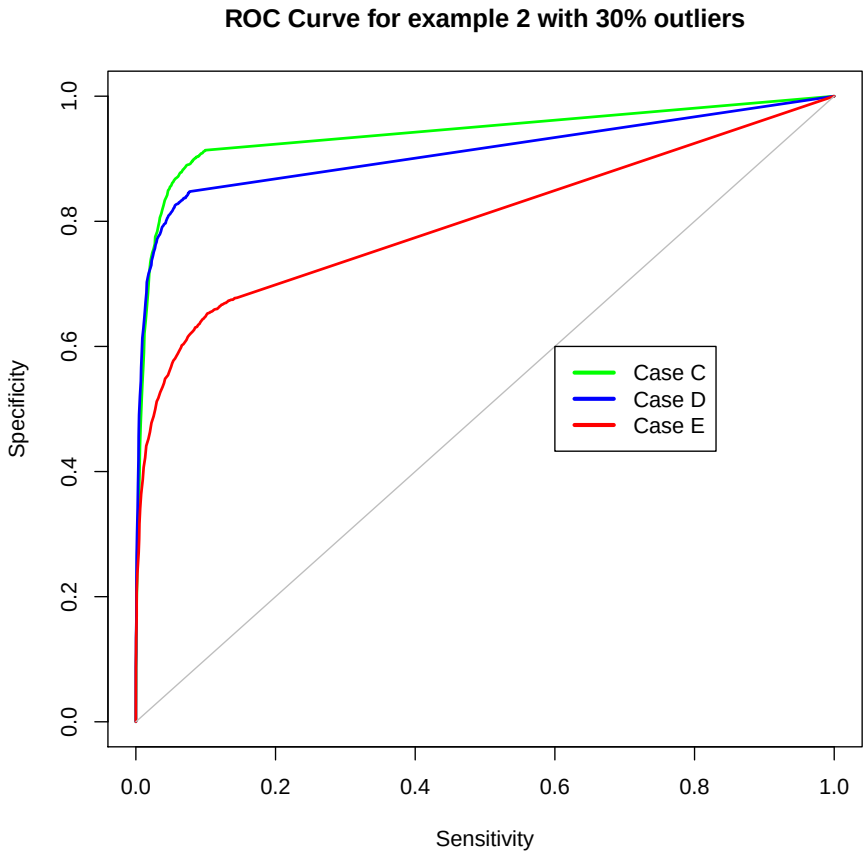

ROC Curve for example 1 with 10% outliers
Specificity
Sensitivity
0.0
0.2
0.4
0.6
0.8
1.0
Case C
Case D
Case E


ROC Curve for example 1 with 20% outliers
Specificity
Sensitivity
0.0
0.2
0.4
0.6
0.8
1.0
Case C
Case D
Case E


ROC Curve for example 1 with 30% outliers
Specificity
Sensitivity
0.0
0.2
0.4
0.6
0.8
1.0
Case C
Case D
Case E


ROC Curve for example 2 with 10% outliers
Specificity
Sensitivity
0.0
0.2
0.4
0.6
0.8
1.0
Case C
Case D
Case E


ROC Curve for example 2 with 20% outliers
Specificity
Sensitivity
0.0
0.2
0.4
0.6
0.8
1.0
Case C
Case D
Case E


ROC Curve for example 2 with 30% outliers
Specificity
Sensitivity
0.0
0.2
0.4
0.6
0.8
1.0
Case C
Case D
Case E