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	0.8	63	25	3.25	0.78
sLTS	9	89	6.19	358.85	14	86	5.92	357.24
MMNNG	68	25	3.25	691.33	88	12	3.13	682.07
SROS	21	76	4.31	56.67	31	69	4.24	51.79
PAWLS	38	56	3.68	16.41	64	36	3.42	19.32
APAWLS	61	28	3.27	20.04	89	11	3.11	20.18
		Case C				**Case D**		
ALasso	3	2	1.94	0.73	0	19	2.52	0.99
sLTS	28	72	5.34	384.69	21	79	5.71	398.44
MMNNG	72	12	2.95	673.93	63	16	3.25	682.47
SROS	41	50	3.7	50.24	8	80	4.76	50.31
PAWLS	52	44	3.64	21.1	98	0	2.98	22.83
APAWLS	74	20	3.19	21.78	97	0	2.97	23.66
		Case E						
ALasso	5	10	2.72	0.72				
sLTS	23	77	5.7	383.1				
MMNNG	73	10	3.04	675.46				
SROS	26	61	4.45	50.08				
PAWLS	55	39	3.48	21.01				
APAWLS	79	15	3.16	22.5				

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	0.7	1	4	1.68	1.19
sLTS	25	75	5.18	426.53	17	82	6.1	440.39
MMNNG	65	5	2.76	470.24	31	33	3.96	473.42
SROS	47	45	3.62	50.14	3	75	5.15	50.54
PAWLS	47	49	3.65	21.51	95	0	2.97	24.83
PAWLS	78	12	3.02	22.14	92	0	2.94	25.29
		Case E						
ALasso	3	3	1.29	0.79				
sLTS	27	73	5.16	417.6				
MMNNG	54	3	3.06	688.65				
SROS	23	49	4.64	51.28				
PAWLS	53	42	3.52	21.57				
APAWLS	64	10	2.86	23.87				

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	0.78	0	3	0.96	1.34
sLTS	1	34	4.52	421.79	0	95	6.84	459.78
MMNNG	38	1	2.3	465.41	5	41	4.29	477.06
SROS	49	38	3.5	51.07	1	76	5.17	53.23
PAWLS	45	47	3.5	21.54	93	0	2.93	26.08
APAWLS	77	10	2.98	22.41	89	0	2.89	26.66
		Case E						
ALasso	0	3	1.15	0.79				
sLTS	0	76	7.1	428.75				
MMNNG	6	21	3.97	704.12				
SROS	9	44	5.1	52.25				
PAWLS	54	21	3.06	21.85				
PAWLS	52	4	2.57	24.28				

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	84	61.38	3.16×10^4	0	93	58.23	3.03×10^4
PAWLS	6	94	15.65	348.92	5	95	14.29	356.33
APAWLS	94	1	9.89	399.08	91	0	9.5	421.68
		Case C				**Case D**		
ALasso	0	0	6.25	4.07	0	1	6.89	4.07
sLTS	0	95	62.58	3.11×10^4	0	96	62.73	3.09×10^4
PAWLS	3	96	16.12	525.96	3	96	16.19	492.91
APAWLS	85	0	9.84	575.21	85	0	9.84	541.23
		Case E						
ALasso	0	0	12.18	4.06				
sLTS	0	97	62.63	3.11×10^4				
PAWLS	4	96	16.35	524.59				
APAWLS	88	0	9.88	569.03				

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	69	65.89	3.17×10^4	0	96	63.61	3.15×10^4
PAWLS	1	98	16.67	633.1	1	98	17.23	588.62
APAWLS	79	0	9.6	670.79	82	0	9.73	624.28
		Case E						
ALasso	0	0	17.41	6.3				
sLTS	0	68	66.41	3.18×10^4				
PAWLS	0	99	16.89	629.49				
APAWLS	78	0	9.62	665.07				

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	0	70.39	3.21×10^4	0	79	65	3.19×10^4
PAWLS	5	80	17.36	703.58	3	88	17.81	661.14
APAWLS	40	0	8.94	737.98	40	3	8.94	695.01
		Case E						
ALasso	0	0	17.89	6.67				
sLTS	0	0	70.03	3.22×10^4				
PAWLS	3	81	17.36	715.17				
APAWLS	38	0	8.76	748.69				

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	0.11	1	0	0.05	1
	Case B	0	0.15	1	0	0.06	1
	Case C	0	0.04	1	0	0	1
	Case D	0.08	0.06	0.8	0	2.22×10^{-4}	1
	Case E	0.03	0.05	0.94	0.01	4.44×10^{-4}	0.98
Example 2	Case A	0	0.25	1	0	0.01	1
	Case B	0	0.25	1	0	0.06	1
	Case C	0	0.17	0.99	0	0.01	1
	Case D	0	0.16	0.98	0	0.01	1
	Case E	0	0.17	0.99	0	0	1

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

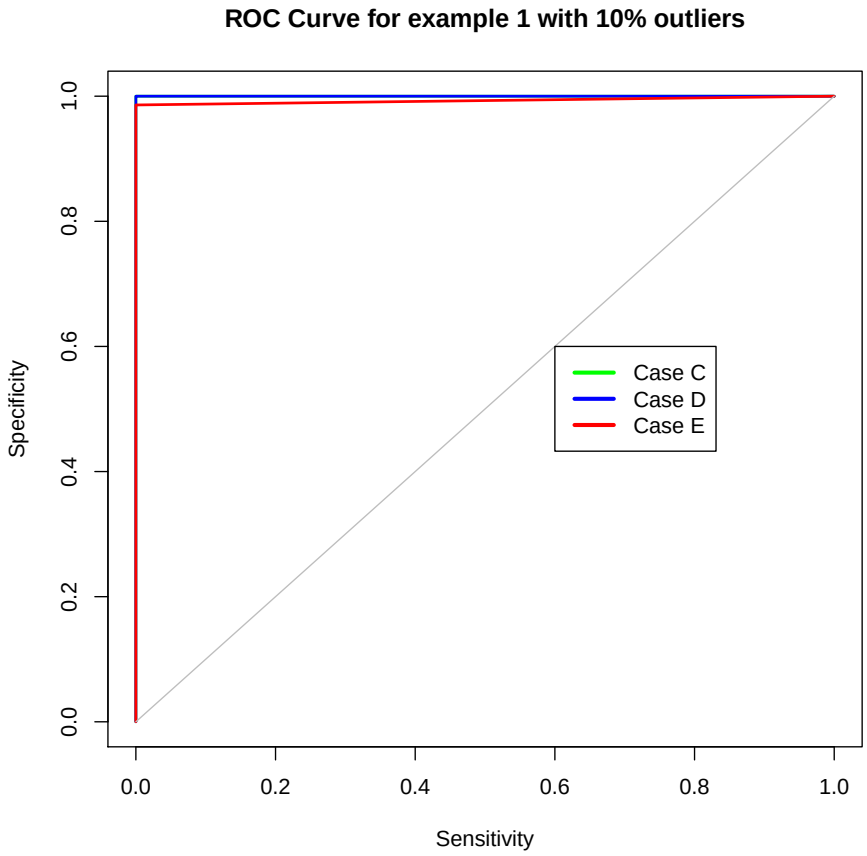
		sLTS			PAWLS		
	Model	M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
Example 1	Case C	0	0.01	1	0	2.5×10^{-4}	1
	Case D	0.25	0.05	0.45	0.01	2.5×10^{-4}	0.99
	Case E	0.07	0.02	0.84	0.06	0	0.82
Example 2	Case C	0.06	0.08	0.56	0	0.01	0.99
	Case D	0.02	0.06	0.88	0.01	0.01	0.98
	Case E	0.06	0.08	0.49	0	0.01	0.99

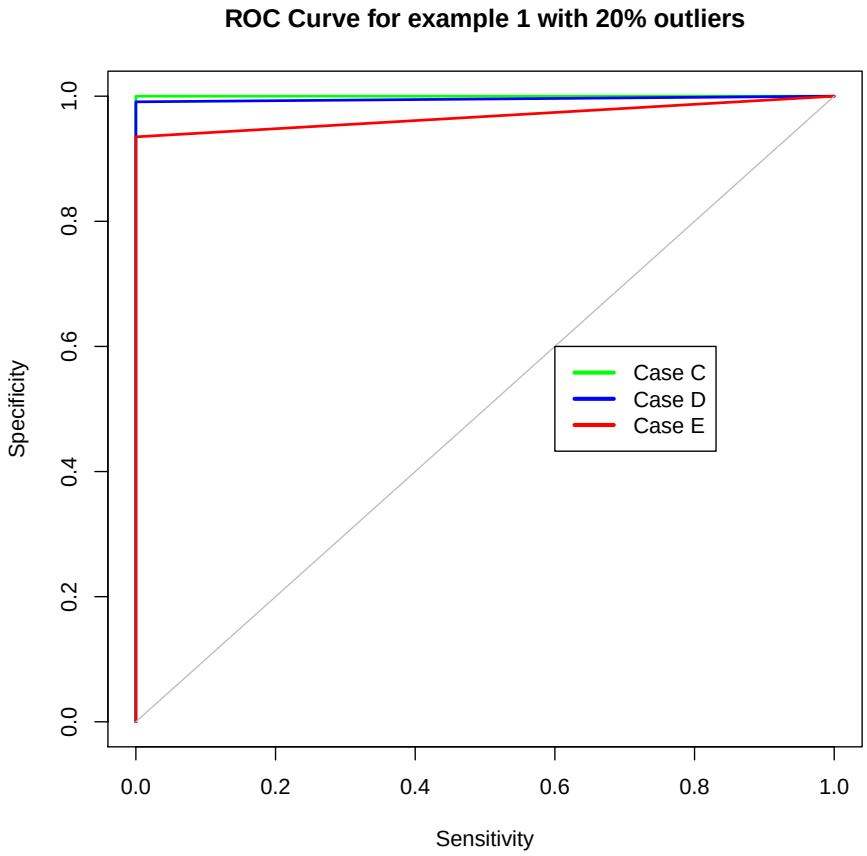
Table 9: Outlier Detection Evaluation in Example 1 and 2 with 30% outliers

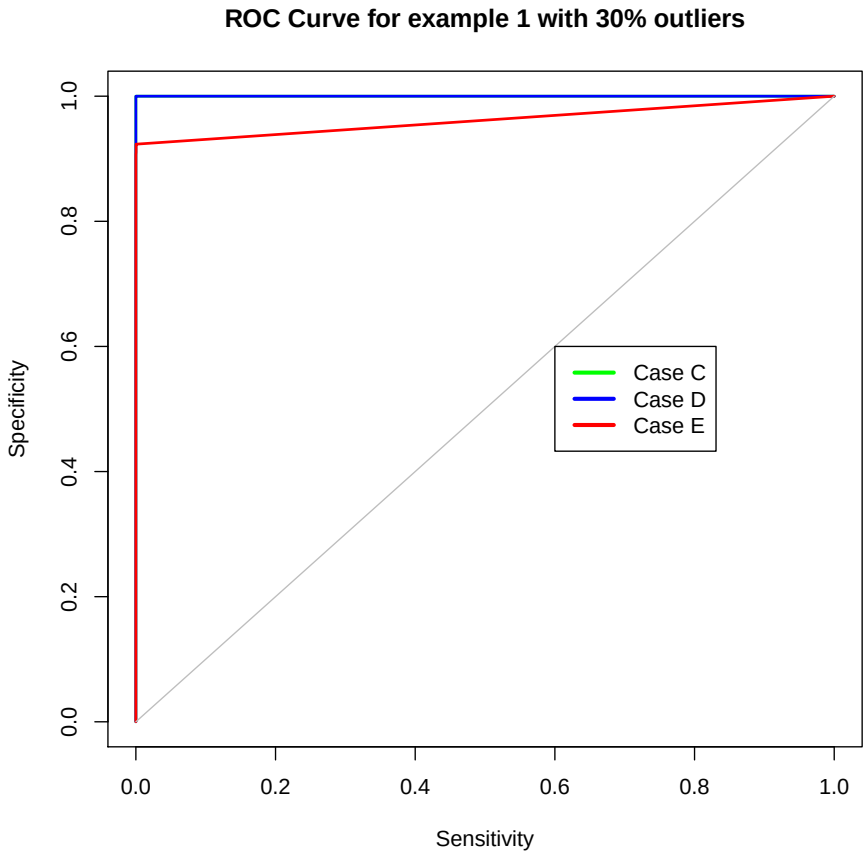
		sLTS			PAWLS		
	Model	M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
Example 1	Case C	0.21	0	0	0	0	1
	Case D	0.46	0.04	0	0	0	1
	Case E	0.45	0.03	0	0.08	8.57×10^{-4}	0.77
Example 2	Case C	0.26	0.04	0	0.02	0.02	0.87
	Case D	0.33	0.07	0	0.05	0.01	0.86
	Case E	0.28	0.05	0	0.03	0.03	0.85

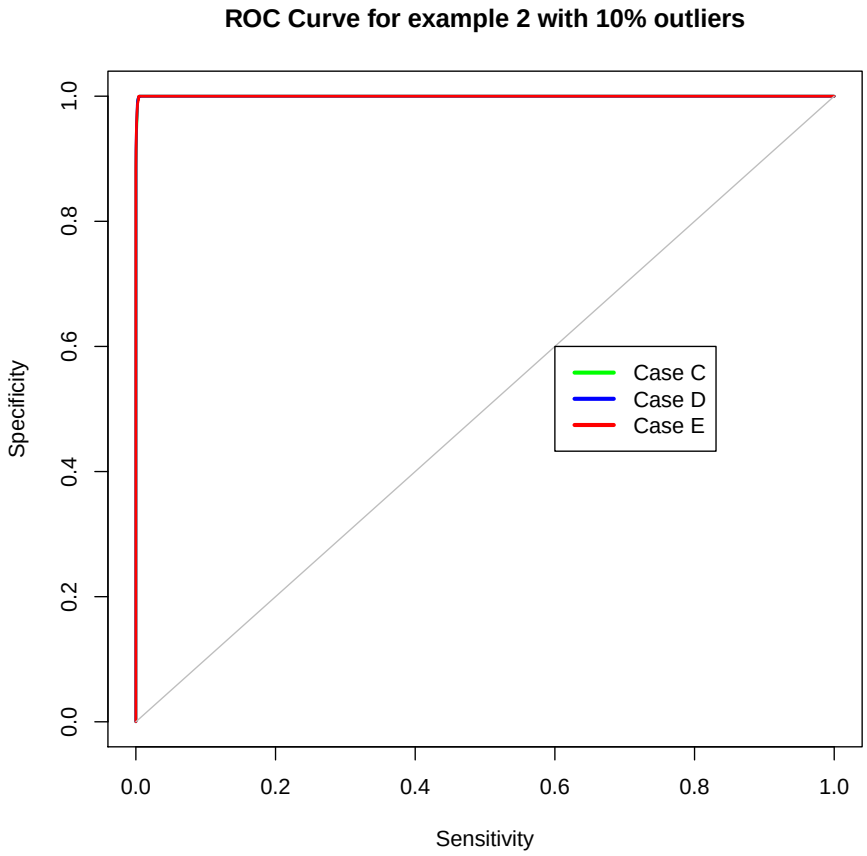
Table 10: Outlier Detection Evaluation in Example 1

		IPOD			PAWLS		
	Model	M (%)	S (%)	JD(%)	M (%)	S (%)	JD(%)
Example 1	Case A	0	0	1	0	0.05	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	0.01	4.44×10^{-4}	0.98


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
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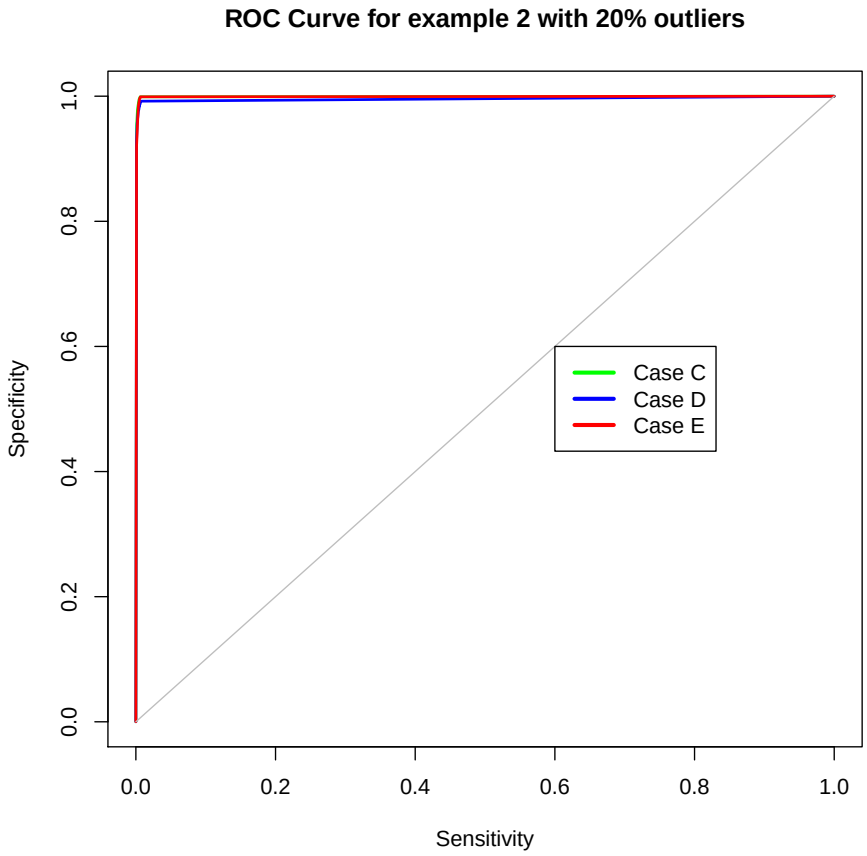
0.2
0.4
0.6
0.8
1.0
Case C
Case D
Case E


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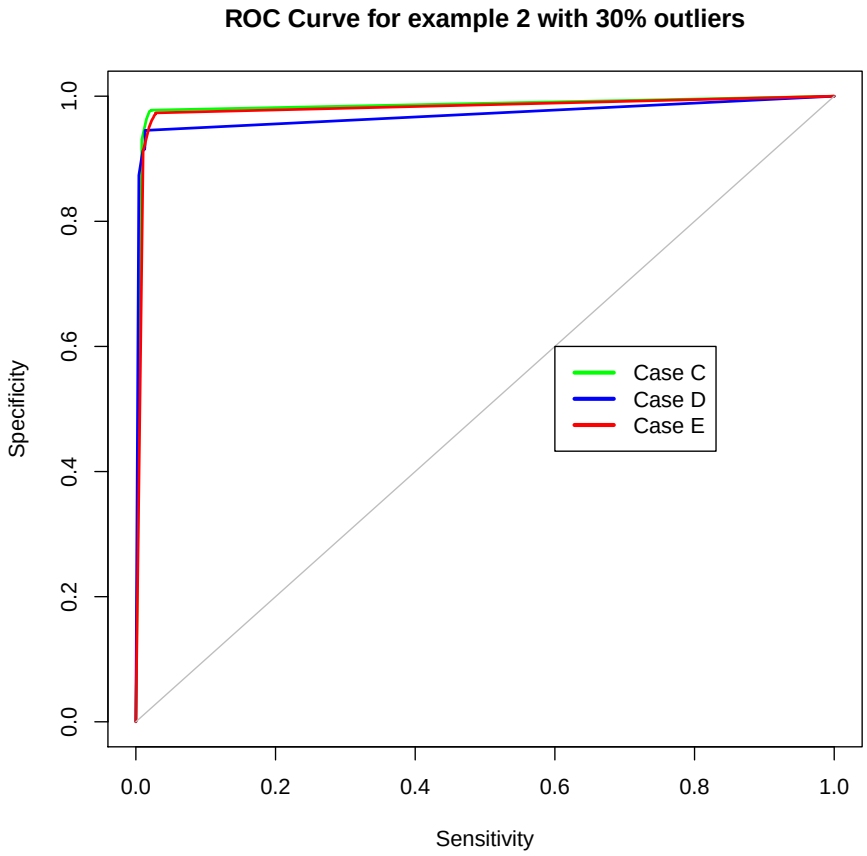
0.2
0.4
0.6
0.8
1.0
Case C
Case D
Case E


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