1 Numerical Result

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

		Variable Selection					Outliers detection			
Case	Method	CFR	OFR	PDR	FDR	AN	M	S	JD	TIME
A	ALasso	72	25	99	7	3.27	-	-	-	0.89
	MMNNG	74.5	20.4	98.3	6.3	3.23	-	-	-	NA
	SROS	21	76	99	27.6	4.31	-	-	-	56.67
	SROS-2	50	50	100	17.9	3.91	0	6.46	100	7.89
	ASROS-2	86	9	98.3	2.2	3.04	0	3.24	100	11.88
	SLTS	15	83	99.3	42.3	5.89	0	11.4	100	200.07
	PAWLS	30	68	99.3	23.1	4.07	0	9.1	100	6.6
	APAWLS	71	18	96	5.6	3.1	0	6.5	100	12.04
B	ALasso	70	15	94	5.9	3.07	-	-	-	0.92
	MMNNG	86	14	100	3.9	3.17	-	-	-	354.78
	SROS	31	69	100	24.6	4.24	-	-	-	51.79
	SROS-2	34	66	100	24.1	4.25	0	25.02	100	6.91
	ASROS-2	95	5	100	1.3	3.05	0	9.48	100	10.29
	SLTS	13	87	100	43.8	5.97	0	13.62	100	216.52
	PAWLS	54	46	100	13.6	3.6	0	10.78	100	6.14
	APAWLS	97	3	100	0.7	3.03	0	8	100	11.73
C	ALasso	0	2	44	10.3	1.61	-	-	-	0.98
	MMNNG	74.7	12.1	95.6	3.3	3.01	-	-	-	NA
	SROS	41	50	97	17.5	3.7	-	-	-	50.24
	SROS-2	22	78	100	30.9	4.73	0	24.36	100	6.66
	ASROS-2	76	16	97.3	4.6	3.11	0	0.11	100	11.69
	SLTS	23	76	99.7	36.9	5.42	0	4.87	100	313.05
	PAWLS	35	62	99	20	3.9	0	3.93	100	6.78
	APAWLS	79	15	98	4.4	3.12	0.2	1.8	99	12.61
D	ALasso	0	14	61	51.7	4.02	-	-	-	1.21
	MMNNG	71.7	11.1	93.9	4.1	2.97	-	-	-	NA
	SROS	8	80	96	37.1	4.76	-	-	-	50.31
	SROS-2	0	34	73.7	55.4	5.27	89.8	9.31	0	25.16
	ASROS-2	0	14	60	51.7	3.91	92.8	5.89	0	25.1
	SLTS	10	89	99.7	43.1	5.77	0	5.62	100	309.51
	PAWLS	46	53	99.7	17.7	3.83	2	1.07	98	8.91
	APAWLS	76	18	98	5.7	3.18	2	0.44	98	15
E	ALasso	0	3	23	81.9	2.72	-	-	-	1.42
	MMNNG	79	11	96.7	3.4	3.03	-	-	-	342.83
	SROS	26	61	95.7	30.2	4.45	-	-	-	50.08
	SROS-2	0	6	32.7	75.3	3.89	87	5.56	5	16.76
	ASROS-2	0	0	13.7	84.2	2.16	91.8	2.64	3	14.29
	SLTS	16	82	99.3	38.4	5.39	0	4	100	385.66
	PAWLS	44	55	99.7	17.9	3.82	0	1.42	100	8.05
	APAWLS	77	12	96.3	4	3.05	2.2	0.56	94	14.1

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

		Variable Selection					Outliers detection			
Case	Method	CFR	OFR	PDR	FDR	AN	M	S	JD	TIME
A	ALasso	97	0	99.6	0	9.96	-	-	-	3.21
	SROS-2	2	98	100	54.7	41.53	0	4.45	100	603.94
	ASROS-2	85	15	100	2	10.25	0	0.42	100	723.54
	SLTS	0	87	98.5	84	61.9	0	24.91	100	1.89×10^4
	PAWLS	4	96	100	32.5	16.13	0	0.9	100	439.93
	APAWLS	90	10	100	1.1	10.13	0	0.35	100	924.47
B	ALasso	77	1	94.3	0.5	9.47	-	-	-	3.23
	SROS-2	3	97	100	52.6	32.94	0	11.72	100	632.84
	ASROS-2	98	2	100	0.2	10.02	0	4.06	100	572.65
	SLTS	0	93	98.7	82.7	57.6	0	24.76	100	1.94×10^4
	PAWLS	4	96	100	34.9	16.67	0	2.84	100	454.22
	APAWLS	98	2	100	0.2	10.02	0	2.31	100	936.15
C	ALasso	0	0	56.1	13.6	7.56	-	-	-	3.92
	SROS-2	1	66	94.4	75	56.81	21.9	10.19	68	1214.61
	ASROS-2	56	38	99.3	6.7	10.79	0	0.16	100	650.33
	SLTS	0	96	99.6	84	62.36	0	16.47	100	2.24×10^4
	PAWLS	4	96	100	38.8	17.88	0	0.98	100	729.23
	APAWLS	86	14	100	1.3	10.15	0	0.19	100	1227.51
D	ALasso	0	1	64.7	60.3	16.75	-	-	-	11.29
	SROS-2	0	96	99.6	87.9	83.53	95.3	4.91	0	6152.51
	ASROS-2	0	19	81.5	70.2	27.85	96.4	4.37	0	4328.89
	SLTS	0	98	99.8	84.6	64.98	0	16.57	100	2.72×10^4
	PAWLS	8	88	99.3	37.7	17.83	5.1	0.01	94	1421.83
	APAWLS	88	6	98.5	2.5	10.16	5.8	0	94	2138.42
E	ALasso	0	0	31.8	70.8	10	-	-	-	6.78
	SROS-2	0	55	92.2	84.6	61.26	85.5	15.8	0	4786.5
	ASROS-2	0	0	49.1	75	17.57	98.9	0.91	0	2236.44
	SLTS	0	96	99.6	84.6	65.06	0	16.61	100	2.74×10^4
	PAWLS	4	96	100	33.8	16.61	0.3	0.27	99	1173.68
	APAWLS	88	9	99.7	1.4	10.15	1.1	0.01	93	1790.1