

附表 1

模拟 1 结果

ε	模型	τ	TP	FDR	TPR	F	$Bias$	$PMSE$
$N(0,1)$	Lasso	0.10	12.3000	0.2126	0.8200	0.8006	14.5687	23.5252
		0.50	15.0000	0.2112	1.0000	0.8790	5.2545	2.8379
		0.90	12.9667	0.2240	0.8644	0.8139	12.7873	17.3924
	Lasso.Kf	0.10	12.7667	0.1619	0.8511	0.8416	5.0544	5.6389
		0.50	14.9667	0.1934	0.9978	0.8884	1.5129	1.1530
		0.90	13.0000	0.1421	0.8667	0.8586	4.6419	5.0817
	Lasso.Kf+	0.10	13.2667	0.1337	0.8844	0.8698	4.2359	4.9693
		0.50	15.0000	0.1522	1.0000	0.9120	1.4960	1.1437
		0.90	13.1333	0.1286	0.8756	0.8687	4.5362	5.3951
MN	Lasso	0.10	12.7000	0.1735	0.8467	0.8341	13.0924	20.5308
		0.50	15.0000	0.2118	1.0000	0.8793	5.4130	2.6947
		0.90	12.8000	0.2262	0.8533	0.8092	12.7366	19.1626
	Lasso.Kf	0.10	12.9667	0.1646	0.8644	0.8456	4.7552	5.4480
		0.50	14.8333	0.1812	0.9889	0.8918	1.8247	1.3008
		0.90	13.6000	0.1810	0.9067	0.8549	4.1120	4.6813
	Lasso.Kf+	0.10	12.9667	0.1001	0.8644	0.8772	4.6411	5.4705
		0.50	15.0000	0.1784	1.0000	0.8961	1.5332	1.2036
		0.90	13.8000	0.1118	0.9200	0.8967	3.7353	4.4935
$t(4)$	Lasso	0.10	12.0667	0.1899	0.8044	0.8036	14.6943	27.6691
		0.50	15.0000	0.2122	1.0000	0.8792	6.2885	4.0679
		0.90	12.2667	0.2159	0.8178	0.7982	14.8062	26.3137
	Lasso.Kf	0.10	12.5000	0.1735	0.8333	0.8244	6.1865	9.5684
		0.50	14.9000	0.1925	0.9933	0.8861	1.9023	2.2438
		0.90	12.6333	0.1593	0.8422	0.8366	5.9257	8.7497
	Lasso.Kf+	0.10	12.9667	0.1520	0.8644	0.8516	5.1467	7.1689
		0.50	15.0000	0.1764	1.0000	0.8948	1.6303	2.1290
		0.90	13.0333	0.1440	0.8689	0.8542	5.2121	7.5877
$E(1)$	Lasso	0.10	12.7000	0.1541	0.8467	0.8430	13.8453	21.5531
		0.50	15.0000	0.2131	1.0000	0.8792	3.9546	2.0249
		0.90	12.5000	0.2364	0.8333	0.7935	14.2703	22.7310
	Lasso.Kf	0.10	12.8000	0.1466	0.8533	0.8498	4.6434	5.4891
		0.50	15.0000	0.2094	1.0000	0.8784	1.2511	1.1574
		0.90	12.5000	0.1880	0.8333	0.8165	6.3183	7.0728
	Lasso.Kf+	0.10	13.7333	0.1060	0.9156	0.8990	2.9701	3.6579
		0.50	15.0000	0.0978	1.0000	0.9448	1.0043	1.1278
		0.90	13.1667	0.1196	0.8778	0.8739	5.1685	5.2909
$\chi^2(5)$	Lasso	0.10	12.3333	0.2899	0.8222	0.7590	15.3359	43.3528
		0.50	13.3333	0.2557	0.8889	0.8043	12.4983	17.2642
		0.90	10.1333	0.3235	0.6756	0.6714	21.2529	67.5179
	Lasso.Kf	0.10	11.0333	0.1526	0.7356	0.7798	9.5974	31.6716
		0.50	13.3667	0.1687	0.8911	0.8552	5.8512	11.8168
		0.90	10.3333	0.1999	0.6889	0.7219	14.3334	46.7885
	Lasso.Kf+	0.10	12.7333	0.1592	0.8489	0.8366	6.0870	25.0636
		0.50	13.3333	0.1817	0.8889	0.8403	6.2993	12.9487
		0.90	10.7667	0.1724	0.7178	0.7579	12.9492	40.4345

附表 2			模拟 2 结果					
ε	模型	τ	TP	FDR	TPR	F	$Bias$	$PMSE$
$N(0,1)$	Lasso	0.10	19.9667	0.2381	0.9983	0.8627	3.8195	4.8332
		0.50	20.0000	0.2180	1.0000	0.8764	2.4978	2.1919
		0.90	19.9667	0.2482	0.9983	0.8566	3.8027	4.7368
	Lasso.Kf	0.10	19.9667	0.1844	0.9983	0.8963	3.0813	2.9531
		0.50	20.0000	0.2082	1.0000	0.8815	2.4167	1.2636
		0.90	19.7667	0.1682	0.9883	0.9013	3.1848	2.9663
	Lasso.Kf ₊	0.10	19.9333	0.1422	0.9967	0.9198	2.7192	2.7744
		0.50	20.0000	0.1554	1.0000	0.9130	2.2469	1.2309
		0.90	19.9333	0.1386	0.9967	0.9222	2.7757	2.9415
MN	Lasso	0.10	20.0000	0.2257	1.0000	0.8708	3.5339	4.3923
		0.50	20.0000	0.2384	1.0000	0.8630	2.6124	2.0362
		0.90	19.9333	0.1846	0.9967	0.8948	3.8053	5.4863
	Lasso.Kf	0.10	19.9333	0.1704	0.9967	0.9039	2.9327	3.0019
		0.50	20.0000	0.1848	1.0000	0.8934	2.5066	1.3061
		0.90	19.9000	0.1577	0.9950	0.9105	3.1800	3.1596
	Lasso.Kf ₊	0.10	19.8667	0.1701	0.9933	0.9016	3.1067	3.1216
		0.50	20.0000	0.1891	1.0000	0.8906	2.5861	1.3985
		0.90	19.9000	0.1658	0.9950	0.9048	3.1507	3.0559
$t(4)$	Lasso	0.10	19.7333	0.2429	0.9867	0.8547	5.1816	8.2645
		0.50	20.0000	0.2237	1.0000	0.8727	2.9284	3.2907
		0.90	19.6667	0.2068	0.9833	0.8765	5.5092	9.5981
	Lasso.Kf	0.10	19.4667	0.1929	0.9733	0.8794	4.7084	5.5632
		0.50	19.9667	0.2080	0.9983	0.8779	2.7071	2.3914
		0.90	19.1667	0.1625	0.9583	0.8921	4.8060	5.5849
	Lasso.Kf ₊	0.10	19.2333	0.1772	0.9617	0.8835	4.8804	5.6527
		0.50	20.0000	0.1635	1.0000	0.9076	2.4748	2.3210
		0.90	19.3000	0.1682	0.9650	0.8906	4.6536	5.6159
$E(1)$	Lasso	0.10	20.0000	0.1624	1.0000	0.9105	1.4494	2.5661
		0.50	20.0000	0.2115	1.0000	0.8806	1.9826	1.8850
		0.90	19.8333	0.2215	0.9917	0.8697	5.1715	6.4954
	Lasso.Kf	0.10	20.0000	0.1052	1.0000	0.9433	0.7060	1.6729
		0.50	20.0000	0.1975	1.0000	0.8864	1.8467	1.1891
		0.90	20.0000	0.1052	1.0000	0.9433	0.7060	1.6729
	Lasso.Kf ₊	0.10	20.0000	0.1190	1.0000	0.9351	0.7351	1.6718
		0.50	20.0000	0.1981	1.0000	0.8856	1.8350	1.1886
		0.90	19.4333	0.0927	0.9717	0.9367	4.4383	3.8715
$\chi^2(5)$	Lasso	0.10	18.7000	0.1660	0.9350	0.8803	6.9042	28.0213
		0.50	19.1000	0.2470	0.9550	0.8401	6.5488	13.4916
		0.90	14.2667	0.2243	0.7133	0.7329	12.6391	54.7366
	Lasso.Kf	0.10	18.9667	0.1703	0.9483	0.8806	5.2082	21.7613
		0.50	18.1667	0.1610	0.9083	0.8657	7.3289	12.5567
		0.90	12.1000	0.1381	0.6050	0.6990	14.8880	43.9086
	Lasso.Kf ₊	0.10	18.7333	0.1662	0.9367	0.8756	5.7924	21.8229
		0.50	18.4333	0.1824	0.9217	0.8595	7.7645	13.0204
		0.90	11.8000	0.1657	0.5900	0.6686	14.9535	42.3223

附表 3

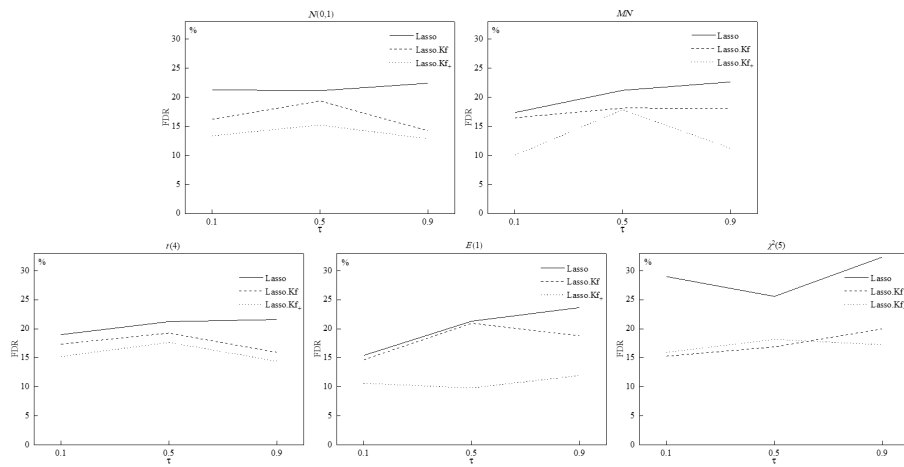
模拟 3 结果

ε	模型	τ	TP	FDR	TPR	F	$Bias$	$PMSE$
$N(0,1)$	Lasso	0.10	15.0000	0.1773	1.0000	0.9007	2.0190	4.2117
		0.50	15.0000	0.2307	1.0000	0.8672	1.5012	1.6758
		0.90	15.0000	0.1739	1.0000	0.9027	1.9061	3.4429
	Lasso.Kf	0.10	15.0000	0.0886	1.0000	0.9517	1.3467	2.7387
		0.50	15.0000	0.1948	1.0000	0.8884	1.3354	1.1262
		0.90	15.0000	0.0886	1.0000	0.9526	1.4739	2.6838
	Lasso.Kf+	0.10	15.0000	0.0634	1.0000	0.9665	1.3570	2.7559
		0.50	15.0000	0.1702	1.0000	0.9035	1.2842	1.1270
		0.90	15.0000	0.0990	1.0000	0.9459	1.4425	2.7402
MN	Lasso	0.10	15.0000	0.1886	1.0000	0.8945	2.0383	4.4938
		0.50	15.0000	0.2013	1.0000	0.8867	1.4544	1.5609
		0.90	15.0000	0.1757	1.0000	0.9020	2.0509	4.1711
	Lasso.Kf	0.10	15.0000	0.0889	1.0000	0.9525	1.4052	2.7895
		0.50	15.0000	0.1769	1.0000	0.8993	1.3483	1.1598
		0.90	15.0000	0.0739	1.0000	0.9606	1.3909	2.8670
	Lasso.Kf+	0.10	15.0000	0.0870	1.0000	0.9535	1.3974	2.7995
		0.50	15.0000	0.1581	1.0000	0.9100	1.2706	1.1984
		0.90	15.0000	0.1017	1.0000	0.9455	1.5689	2.9593
$t(4)$	Lasso	0.10	14.9667	0.1816	0.9978	0.8978	2.7955	6.6182
		0.50	15.0000	0.1542	1.0000	0.9135	1.5610	2.6005
		0.90	14.9333	0.1947	0.9956	0.8881	2.7788	6.5473
	Lasso.Kf	0.10	14.9667	0.1036	0.9978	0.9429	2.0427	4.6693
		0.50	15.0000	0.1478	1.0000	0.9176	1.3627	1.9918
		0.90	15.0000	0.1175	1.0000	0.9357	2.0512	4.6558
	Lasso.Kf+	0.10	14.9000	0.0877	0.9933	0.9499	2.0652	4.8316
		0.50	15.0000	0.1418	1.0000	0.9205	1.3340	2.1214
		0.90	14.9667	0.0846	0.9978	0.9532	1.9418	4.6869
$E(1)$	Lasso	0.10	15.0000	0.1483	1.0000	0.9176	0.6570	2.2371
		0.50	15.0000	0.2624	1.0000	0.8463	1.1816	1.7062
		0.90	14.9333	0.1951	0.9956	0.8887	2.8455	4.9418
	Lasso.Kf	0.10	15.0000	0.0825	1.0000	0.9562	0.2854	1.7220
		0.50	15.0000	0.1718	1.0000	0.9045	0.8914	1.1707
		0.90	14.9000	0.1162	0.9933	0.9337	2.4079	3.1534
	Lasso.Kf+	0.10	15.0000	0.0743	1.0000	0.9600	0.3022	1.7895
		0.50	15.0000	0.1393	1.0000	0.9209	0.9512	1.1473
		0.90	14.9333	0.0871	0.9956	0.9513	2.2805	3.1363
$\chi^2(5)$	Lasso	0.10	14.9667	0.2142	0.9978	0.8779	3.1852	23.2474
		0.50	14.7667	0.2063	0.9844	0.8769	3.7300	12.1368
		0.90	12.5000	0.1684	0.8333	0.8300	7.8333	45.4944
	Lasso.Kf	0.10	14.7000	0.1273	0.9800	0.9213	2.4656	21.4141
		0.50	14.7333	0.1670	0.9822	0.8959	3.8710	11.3104
		0.90	12.1000	0.1092	0.8067	0.8408	7.8837	33.7887
	Lasso.Kf+	0.10	14.8667	0.1529	0.9911	0.9094	2.4681	21.2068
		0.50	14.5333	0.1460	0.9689	0.9043	3.6311	11.5630
		0.90	12.8000	0.1522	0.8533	0.8451	8.1977	32.1298

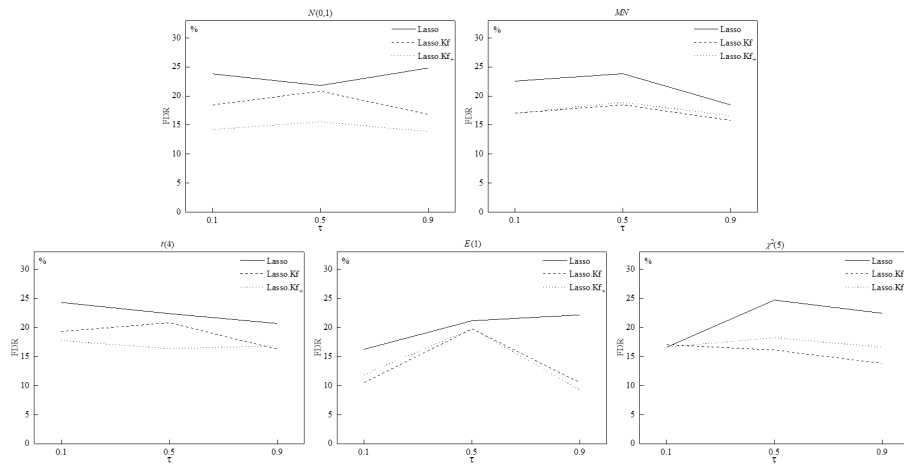
附表 4

模拟 4 和模拟 5 结果

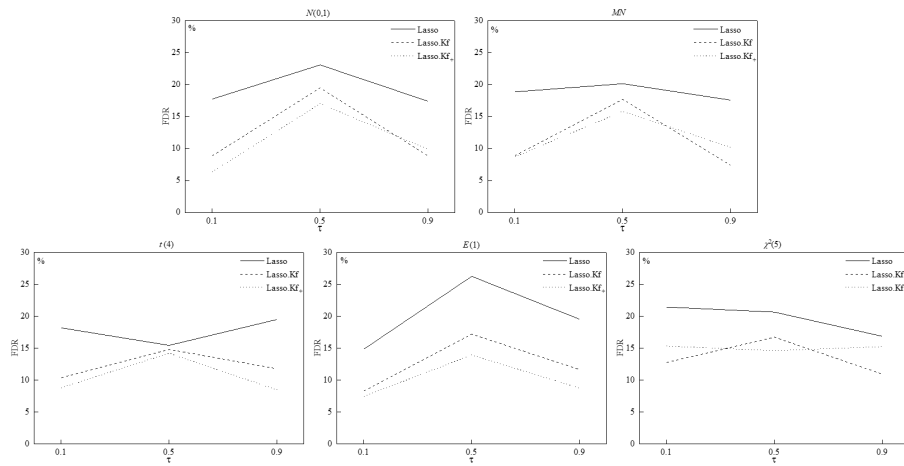
模拟	X	模型	τ	TP	FDR	TPR	F	$Bias$	$PMSE$
模拟 4	Nt	Lasso	0.10	9.9667	0.1723	0.9967	0.9008	1.7998	3.5246
			0.50	10.0000	0.1887	1.0000	0.8922	1.3458	1.3002
			0.90	9.9667	0.1701	0.9967	0.9024	1.8228	3.4856
		Lasso.Kf	0.10	10.0000	0.1624	1.0000	0.9069	1.5926	2.7308
			0.50	10.0000	0.1751	1.0000	0.8972	1.3446	1.1591
			0.90	10.0000	0.1669	1.0000	0.9054	1.6250	2.8491
		Lasso.Kf +	0.10	9.9667	0.1263	0.9967	0.9273	1.6679	2.7309
			0.50	10.0000	0.1466	1.0000	0.9155	1.2071	1.2044
			0.90	10.0000	0.1324	1.0000	0.9247	1.4365	2.7037
	$N\chi^2$	Lasso	0.10	10.0000	0.1829	1.0000	0.8960	2.0061	3.4772
			0.50	10.0000	0.2527	1.0000	0.8511	1.3726	1.2305
			0.90	10.0000	0.2223	1.0000	0.8726	1.9902	3.4292
		Lasso.Kf	0.10	10.0000	0.1502	1.0000	0.9169	1.5931	2.6879
			0.50	10.0000	0.1905	1.0000	0.8863	1.3039	1.1736
			0.90	10.0000	0.1974	1.0000	0.8868	1.7141	2.7596
		Lasso.Kf +	0.10	10.0000	0.1592	1.0000	0.9093	1.4785	2.6148
			0.50	10.0000	0.1546	1.0000	0.9070	1.2339	1.1534
			0.90	10.0000	0.1480	1.0000	0.9170	1.6699	2.8572
	NLN	Lasso	0.10	10.0000	0.2064	1.0000	0.8816	1.8272	3.4551
			0.50	10.0000	0.2306	1.0000	0.8665	1.3030	1.2426
			0.90	9.9667	0.1820	0.9967	0.8948	1.9350	3.4599
		Lasso.Kf	0.10	10.0000	0.1731	1.0000	0.9021	1.6467	2.8307
			0.50	10.0000	0.1503	1.0000	0.9120	1.1831	1.1443
			0.90	9.9667	0.1626	0.9967	0.9070	1.5339	2.6358
		Lasso.Kf +	0.10	10.0000	0.0924	1.0000	0.9499	1.4821	2.7825
			0.50	10.0000	0.1661	1.0000	0.9040	1.2947	1.2025
			0.90	9.9667	0.1732	0.9967	0.8994	1.5097	2.6249
模拟 5	Nt_1	Lasso	0.10	15.0000	0.2239	1.0000	0.8724	2.1913	3.7792
			0.50	15.0000	0.2772	1.0000	0.8362	1.5714	1.2840
			0.90	15.0000	0.2330	1.0000	0.8656	2.2178	3.7138
		Lasso.Kf	0.10	14.9667	0.1762	0.9978	0.9004	1.6614	2.6889
			0.50	15.0000	0.2025	1.0000	0.8816	1.4246	1.1329
			0.90	15.0000	0.1634	1.0000	0.9079	1.7186	2.6773
		Lasso.Kf +	0.10	15.0000	0.1802	1.0000	0.8981	1.7710	2.6807
			0.50	15.0000	0.1491	1.0000	0.9132	1.4419	1.1283
			0.90	14.9667	0.1372	0.9978	0.9238	1.6725	2.7735
	$N\chi_1^2$	Lasso	0.10	15.0000	0.2047	1.0000	0.8836	2.2808	3.7466
			0.50	15.0000	0.2959	1.0000	0.8225	1.5644	1.2708
			0.90	14.9000	0.2228	0.9933	0.8696	2.2195	3.8170
		Lasso.Kf	0.10	15.0000	0.1706	1.0000	0.9035	1.7237	2.6791
			0.50	15.0000	0.1998	1.0000	0.8843	1.5174	1.1378
			0.90	15.0000	0.1707	1.0000	0.9045	1.7209	2.6619
		Lasso.Kf +	0.10	15.0000	0.1515	1.0000	0.9148	1.6156	2.6985
			0.50	15.0000	0.1745	1.0000	0.8999	1.5247	1.1480
			0.90	15.0000	0.1641	1.0000	0.9071	1.7869	2.7099



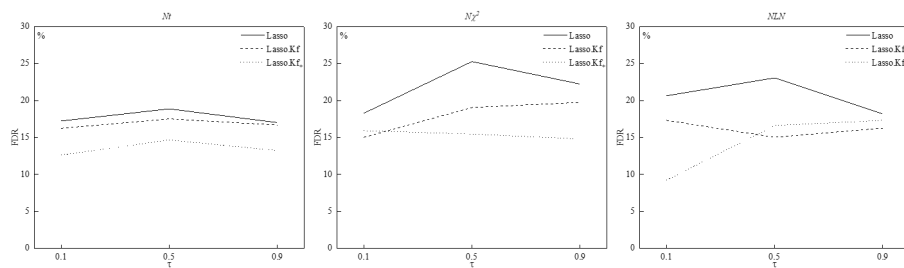
附图 1 各分位点下模拟 1 的 FDR



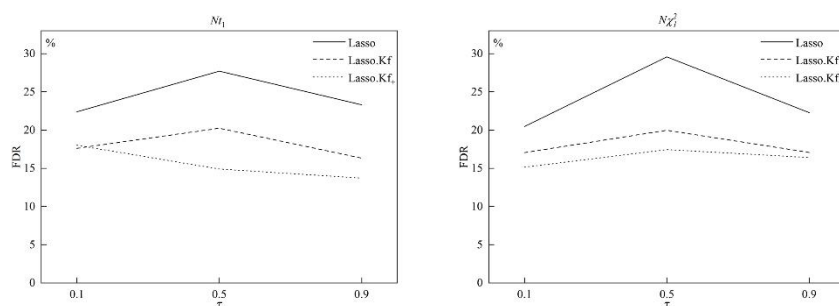
附图 2 各分位点下模拟 2 的 FDR



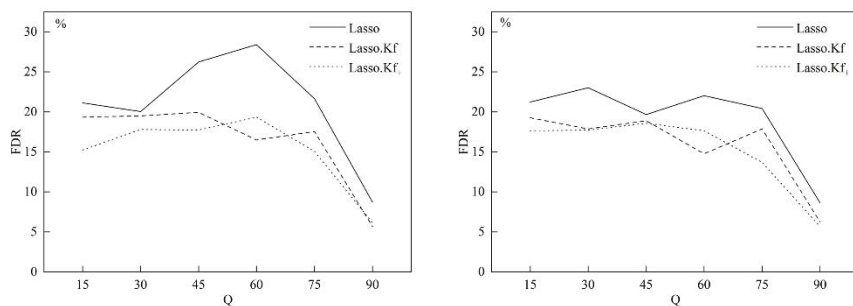
附图 3 各分位点下模拟 3 的 FDR



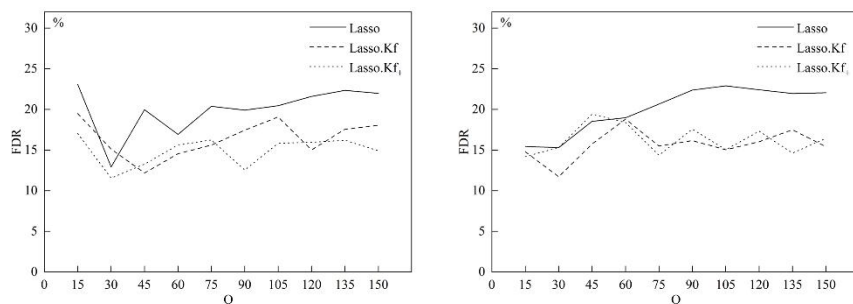
附图 4 各分位点下模拟 4 的 FDR



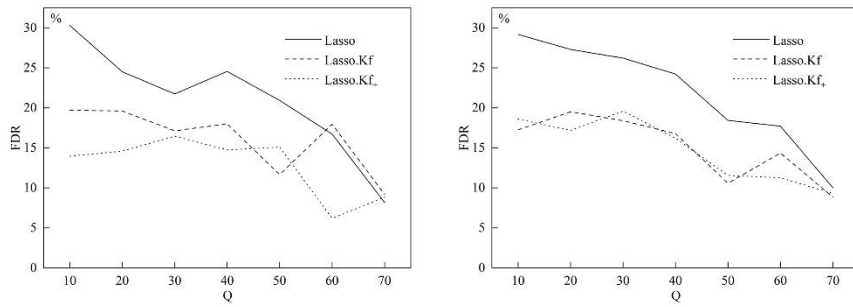
附图 5 各分位点下模拟 5 的 FDR



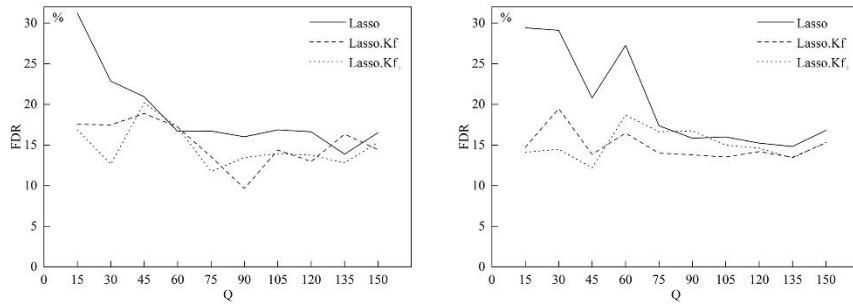
附图 6 系数的不同稀疏程度下模拟 1 的 FDR (左图: 误差服从正态分布; 右图: 误差服从 t 分布)



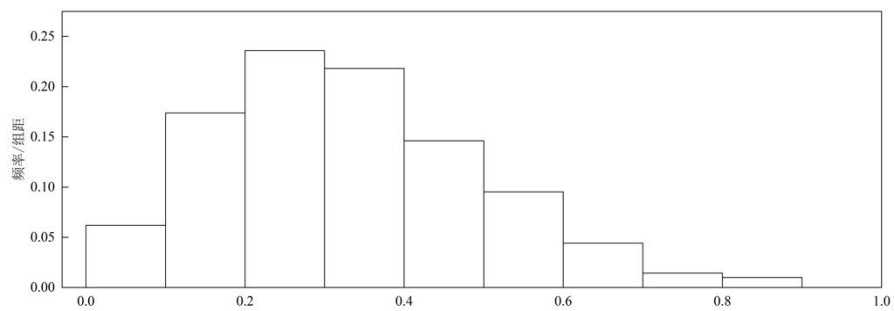
附图 7 系数的不同稀疏程度下模拟 3 的 FDR (左图: 误差服从正态分布; 右图: 误差服从 t 分布)



附图 8 系数的不同稀疏程度下模拟 4 的 FDR (左图: 解释变量服从正态分布; 右图: 混合正态分布)



附图 9 系数的不同稀疏程度下模拟 5 的 FDR (左图: 解释变量服从正态分布; 右图: 混合正态分布)



附图 10 相关系数绝对值直方图