We compared our method SIFS with two types of LS-TV method.

First one is given the $K^\star$ true number of change points and the upper bound of change point which is $3K^\star$.

Second one is given the upper bound of change point which is $3K^\star$ and estimate the number of change points with this rule: $\hat{K} = argmin \frac{J(K+1)}{J(K)} > 1 - \lambda$ where $\lambda = 0.05$.

Furthermore, we will test under differen settings. First setting is the change point is fixed and the μ is also fixed.

Table 1: Simulation Result of n=1000

Method	Criteria	Low Noise		Medium Noise		High Noise	
		Mean	SD	Mean	SD	Mean	SD
SIFS	$\varepsilon(\hat{T}\|T^\star)$	0.00000	0.00000	0.00002	0.00014	0.00345	0.00242
	$\varepsilon(T^\star\|\hat{T})$	0.00410	0.01414	0.00391	0.01981	0.01095	0.02211
	FDR	0.00827	0.02584	0.00694	0.02443	0.23069	0.10778
	PDR	1.00000	0.00000	0.99833	0.01173	0.78750	0.10215
LS-TV(K=11)	$\varepsilon(\hat{T}\|T^\star)$	0.00029	0.00046	0.00022	0.00042	0.00609	0.00802
	$\varepsilon(T^\star\|\hat{T})$	0.00029	0.00046	0.00022	0.00042	0.01039	0.02852
	FDR	0.02217	0.03800	0.01833	0.03469	0.14250	0.07883
	PDR	0.97583	0.03800	0.98167	0.03469	0.85750	0.07883
LS-TV	$\varepsilon(\hat{T}\|T^\star)$	0.00001	0.00010	0.00001	0.00010	0.01370	0.01001
	$\varepsilon(T^\star\|\hat{T})$	0.04651	0.05443	0.05022	0.05486	0.00729	0.02807
	FDR	0.07635	0.05556	0.07902	0.05117	0.13074	0.08609
	PDR	0.99917	0.00833	0.99917	0.00833	0.82500	0.09213

Table 2: Simulation Result of n=5000

Method	Criteria	Low Noise		Medium Noise		High Noise	
		Mean	SD	Mean	SD	Mean	SD
SIFS	$\varepsilon(\hat{T}\|T^\star)$	0.00000	0.00000	0.00001	0.00007	0.00099	0.00084
	$\varepsilon(T^\star\|\hat{T})$	0.00000	0.00000	0.00151	0.00992	0.00143	0.00393
	FDR	0.00000	0.00000	0.00718	0.02543	0.21404	0.09321
	PDR	1.00000	0.00000	0.99583	0.01825	0.78833	0.09206
LS-TV(K=11)	$\varepsilon(\hat{T}\|T^\star)$	0.00004	0.00008	0.00004	0.00008	0.00329	0.00710
	$\varepsilon(T^\star\|\hat{T})$	0.00004	0.00008	0.00004	0.00008	0.00454	0.02315
	FDR	0.01667	0.03350	0.01667	0.03350	0.13833	0.09268
	PDR	0.98333	0.03350	0.98333	0.03350	0.86167	0.09268
LS-TV	$\varepsilon(\hat{T}\|T^\star)$	0.00001	0.00004	0.00001	0.00002	0.01099	0.00992
	$\varepsilon(T^\star\|\hat{T})$	0.04173	0.05013	0.04177	0.05150	0.02131	0.01819
	FDR	0.06387	0.04549	0.06973	0.03192	0.12431	0.08361
	PDR	0.99583	0.01825	0.99833	0.01173	0.83250	0.09288

Second setting is the change point is random but the μ is still fixed.

Table 3: Simulation Result of n=1000

Method	Criteria	Low Noise		Medium Noise		High Noise	
		Mean	SD	Mean	SD	Mean	SD
SIFS	$\varepsilon(\hat{T}\|T^\star)$	0.00001	0.00010	0.00004	0.00019	0.00395	0.00356
	$\varepsilon(T^\star\|\hat{T})$	0.00261	0.01258	0.00511	0.02001	0.01090	0.02497
	FDR	0.00538	0.02255	0.01173	0.03014	0.24411	0.10699
	PDR	0.99917	0.00833	0.99667	0.01641	0.76750	0.10547
LS-TV(K=11)	$\varepsilon(\hat{T}\|T^\star)$	0.00021	0.00041	0.00025	0.00044	0.00662	0.00788
	$\varepsilon(T^\star\|\hat{T})$	0.00021	0.00041	0.00025	0.00044	0.02357	0.04519
	FDR	0.01750	0.03411	0.02083	0.03627	0.14917	0.09423
	PDR	0.98250	0.03411	0.97917	0.03627	0.85083	0.09423
LS-TV	$\varepsilon(\hat{T}\|T^\star)$	0.00001	0.00010	0.00004	0.00020	0.01194	0.00911
	$\varepsilon(T^\star\|\hat{T})$	0.04791	0.05504	0.04187	0.04673	0.00973	0.03389
	FDR	0.07660	0.05469	0.08083	0.05270	0.12878	0.09630
	PDR	0.99917	0.00833	0.99667	0.01641	0.83083	0.09583

Table 4: Simulation Result of n=5000

Method	Criteria	Low Noise		Medium Noise		High Noise	
		Mean	SD	Mean	SD	Mean	SD
SIFS	$\varepsilon(\hat{T}\|T^\star)$	0.00000	0.00000	0.00001	0.00007	0.00103	0.00096
	$\varepsilon(T^\star\|\hat{T})$	0.00273	0.00124	0.00067	0.00504	0.00256	0.00772
	FDR	0.00385	0.01695	0.00487	0.01939	0.24808	0.10526
	PDR	1.00000	0.00000	0.99667	0.01641	0.75833	0.10494
LS-TV(K=11)	$\varepsilon(\hat{T}\|T^\star)$	0.00004	0.00008	0.00005	0.00008	0.00311	0.00677
	$\varepsilon(T^\star\|\hat{T})$	0.00004	0.00008	0.00005	0.00008	0.00763	0.02604
	FDR	0.01750	0.03411	0.01917	0.03525	0.13750	0.09503
	PDR	0.9825	0.03411	0.98083	0.03525	0.86250	0.09503
LS-TV	$\varepsilon(\hat{T}\|T^\star)$	0.00004	0.00002	0.00000	0.00000	0.01199	0.00956
	$\varepsilon(T^\star\|\hat{T})$	0.05269	0.05731	0.04442	0.05115	0.00031	0.00030
	FDR	0.06789	0.04414	0.06640	0.03384	0.12090	0.08658
	PDR	0.99833	0.01173	1.00000	0.00000	0.83000	0.09904

The following table show the simulation result of p=1.

Table 5: Simulation Result of n=1000

Method	Criteria	Low Noise		Medium Noise	
		Mean	SD	Mean	SD
SIFS	$\varepsilon(\hat{T}\|T^\star)$	0.54988	0.00248	0.55000	0.00260
	$\varepsilon(T^\star\|\hat{T})$	0.00832	0.02668	0.00568	0.02023
	FDR	0.24417	0.15725	0.23667	0.16271
	PDR	0.38500	0.07747	0.38500	0.07747
SBFS	$\varepsilon(\hat{T}\|T^\star)$	0.00053	0.00098	0.00260	0.00422
	$\varepsilon(T^\star\|\hat{T})$	0.00118	0.00652	0.00425	0.01687
	FDR	0.12143	0.17380	0.21429	0.19912
	PDR	0.88000	0.17421	0.78667	0.19831

Table 6: Simulation Result of n=5000

Method	Criteria	Low Noise		Medium Noise	
		Mean	SD	Mean	SD
SIFS	$\varepsilon(\hat{T}\|T^\star)$	0.00733	0.00983	0.00864	0.01324
	$\varepsilon(T^\star\|\hat{T})$	0.04089	0.05776	0.03086	0.04882
	FDR	0.47604	0.14399	0.44619	0.14426
	PDR	0.38833	0.08225	0.39333	0.08040
SBFS	$\varepsilon(\hat{T}\|T^\star)$	0.00013	0.00020	0.00044	0.00074
	$\varepsilon(T^\star\|\hat{T})$	0.00013	0.00020	0.00044	0.00074
	FDR	0.14000	0.16535	0.22333	0.19566
	PDR	0.86000	0.16535	0.77667	0.19566

The following table show the simulation result of p=5.

Table 7: Simulation Result of n=1000

Method	Criteria	Low Noise		Medium Noise	
		Mean	SD	Mean	SD
SIFS	$\varepsilon(\hat{T}\|T^\star)$	0.00278	0.00317	0.00317	0.00354
	$\varepsilon(T^\star\|\hat{T})$	0.04580	0.06349	0.04688	0.06193
	FDR	0.42080	0.10282	0.42255	0.09071
	PDR	0.50200	0.05682	0.49600	0.06017
SBFS	$\varepsilon(\hat{T}\|T^\star)$	0.00026	0.00058	0.00028	0.00057
	$\varepsilon(T^\star\|\hat{T})$	0.00109	0.00791	0.00060	0.00351
	FDR	0.28451	0.10658	0.29209	0.11762
	PDR	0.93400	0.13198	0.92200	0.15148

Table 8: Simulation Result of n=5000

Method	Criteria	Low Noise		Medium Noise	
		Mean	SD	Mean	SD
SIFS	$\varepsilon(\hat{T}\|T^\star)$	0.01113	0.02008	0.00823	0.01227
	$\varepsilon(T^\star\|\hat{T})$	0.05946	0.06284	0.03930	0.05603
	FDR	0.45662	0.15054	0.44752	0.14726
	PDR	0.41667	0.09025	0.40167	0.09204
SBFS	$\varepsilon(\hat{T}\|T^\star)$	0.00013	0.0002	0.00065	0.00142
	$\varepsilon(T^\star\|\hat{T})$	0.00140	0.01269	0.00065	0.00142
	FDR	0.13429	0.17861	0.18667	0.18544
	PDR	0.86667	0.17727	0.81333	0.18544