

R-Output Presentation

Chenghui Zheng

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(a) Linear Model with Independent Predictors

$$Y_1 \sim 1.5X_1 + 1.5X_2 + 2X_3 + 2X_4 + 2X_5 + 3X_6 + 4X_7 + 5X_8 + \epsilon$$

(b) Linear Model with Correlated Predictors

$$Y_2 \sim 1.5X_1 + 1.5X_2 + 2X_3 + 2X_4 + 2X_5 + 3X_6 + 4X_7 + 5X_8 + \epsilon$$

Where $X_1 \not\perp X_2$ and $\text{cov}(X_1, X_2) = 0, 0.5, 0.75, 0.9$ respectively.

(c) Linear Model with Correlated Predictors and Different SNR

$$Y_3 \sim 1.5X_1 + 1.5X_2 + 2X_3 + 2X_4 + 2X_5 + 3X_6 + 4X_7 + 5X_8 + \epsilon$$

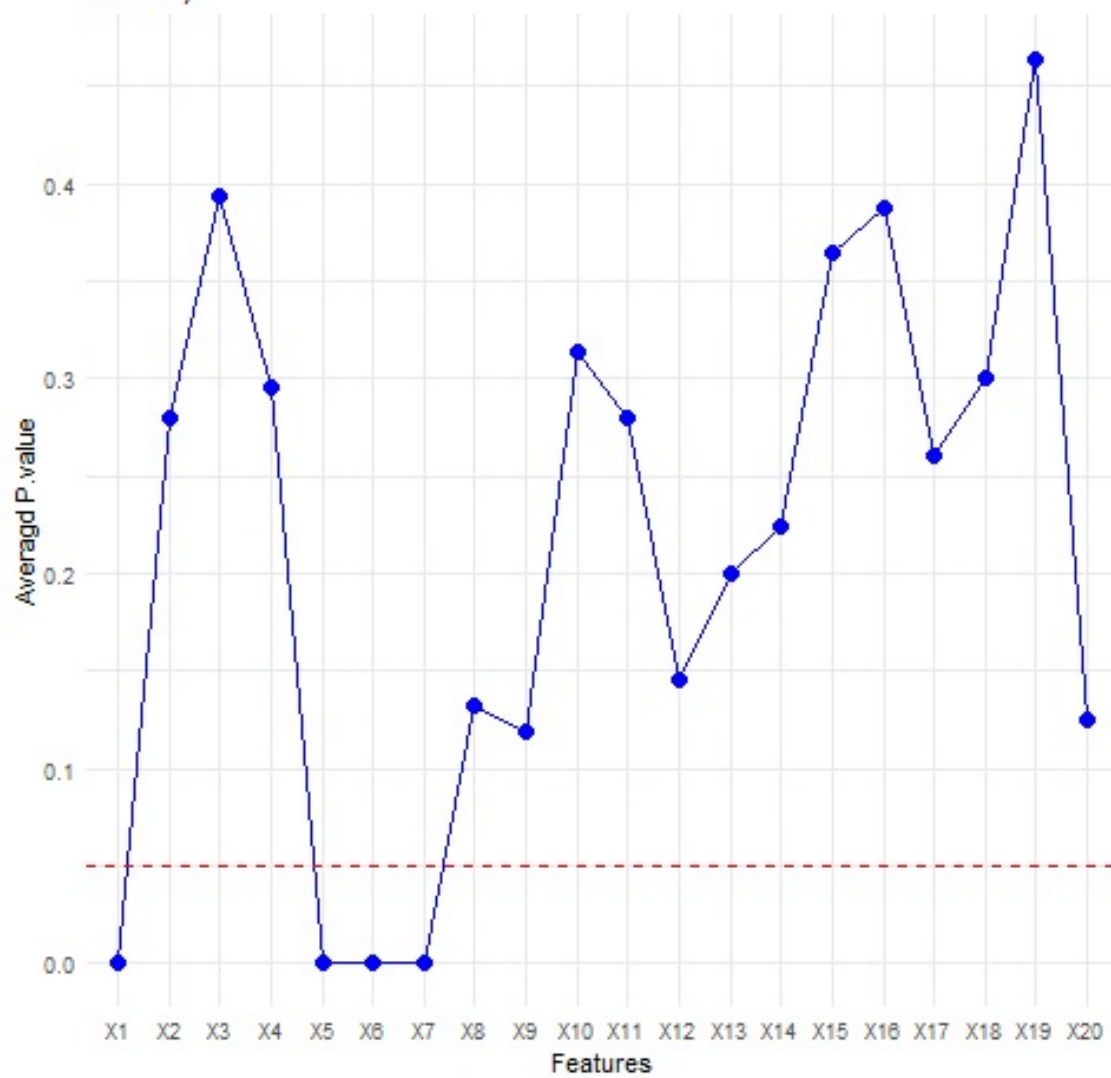
Where $\text{cov}(X_i, X_j) = \rho^{|i-j|}$ and $\epsilon \sim N(0, \sigma^2)$ with $\sigma^2 = 0.1, 0.5, 0.75, 2.1$.

(d) Non-linear Model

$$Y_4 \sim 2X_1^2 + 2\cos(4X_2) + \sin(X_3) + \exp\left(\frac{X_4}{3}\right) + 3X_5 + X_6^3 + 5X_7 + \max(0, X_8)$$

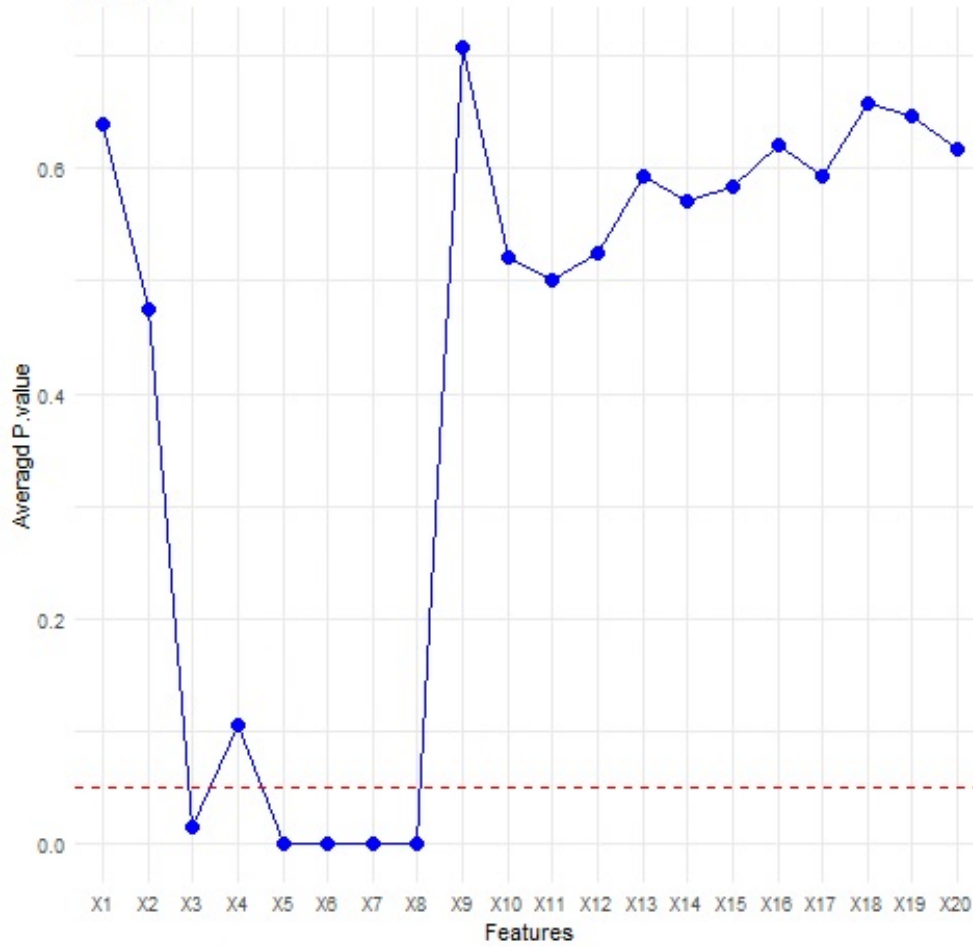
Low :

Case d:

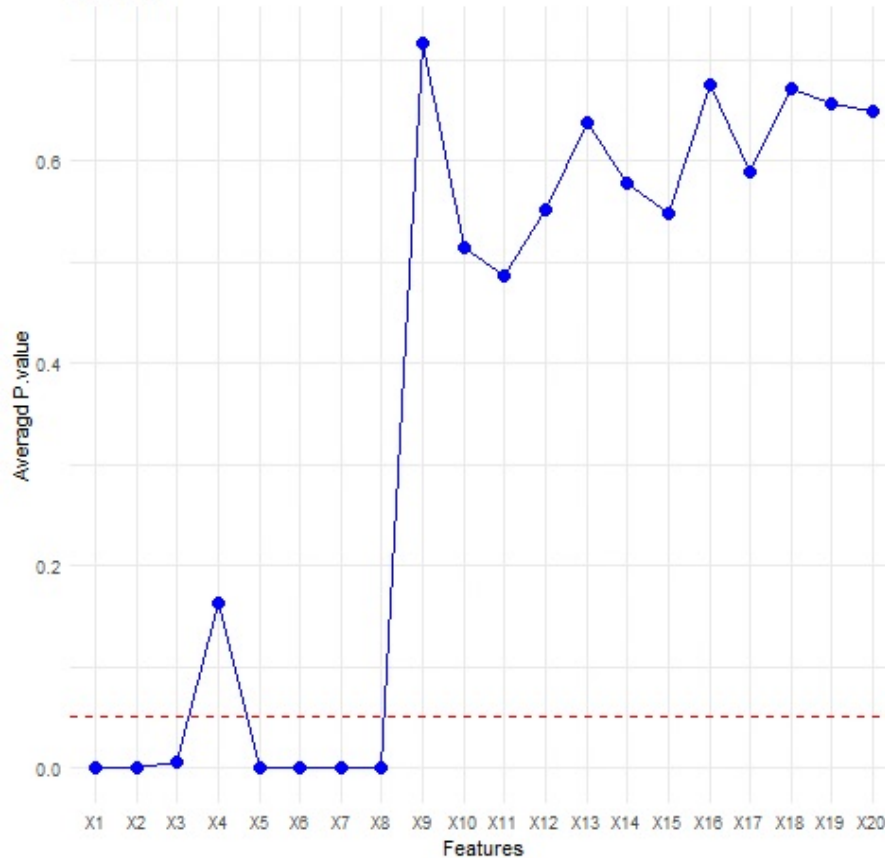


GCM:

Case d):



Case d):



GCM
(with transformation).

For X_1 to X_8 :

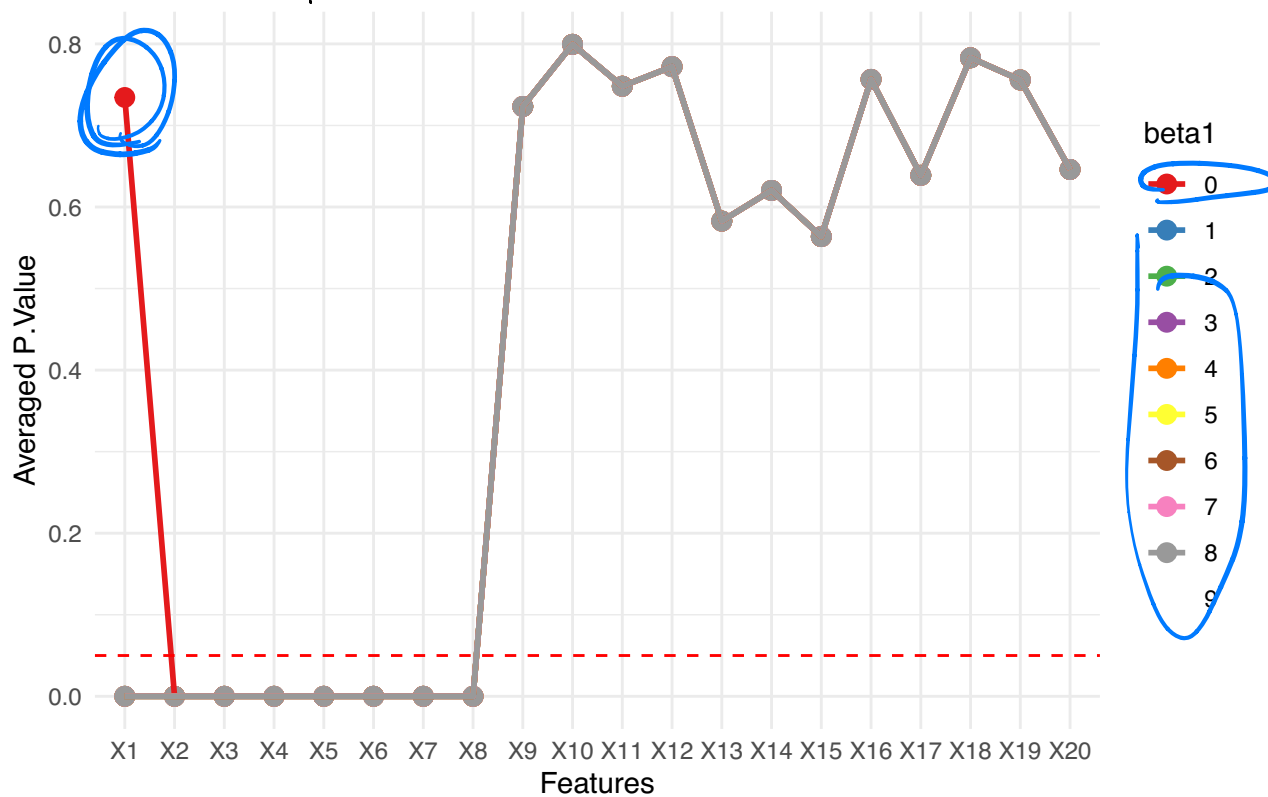
$$H_0: f_2(X_j) \perp\!\!\!\perp Y \mid Z$$

For X_9 to X_{20} :

$$H_0: X_j \perp\!\!\!\perp Y \mid Z$$

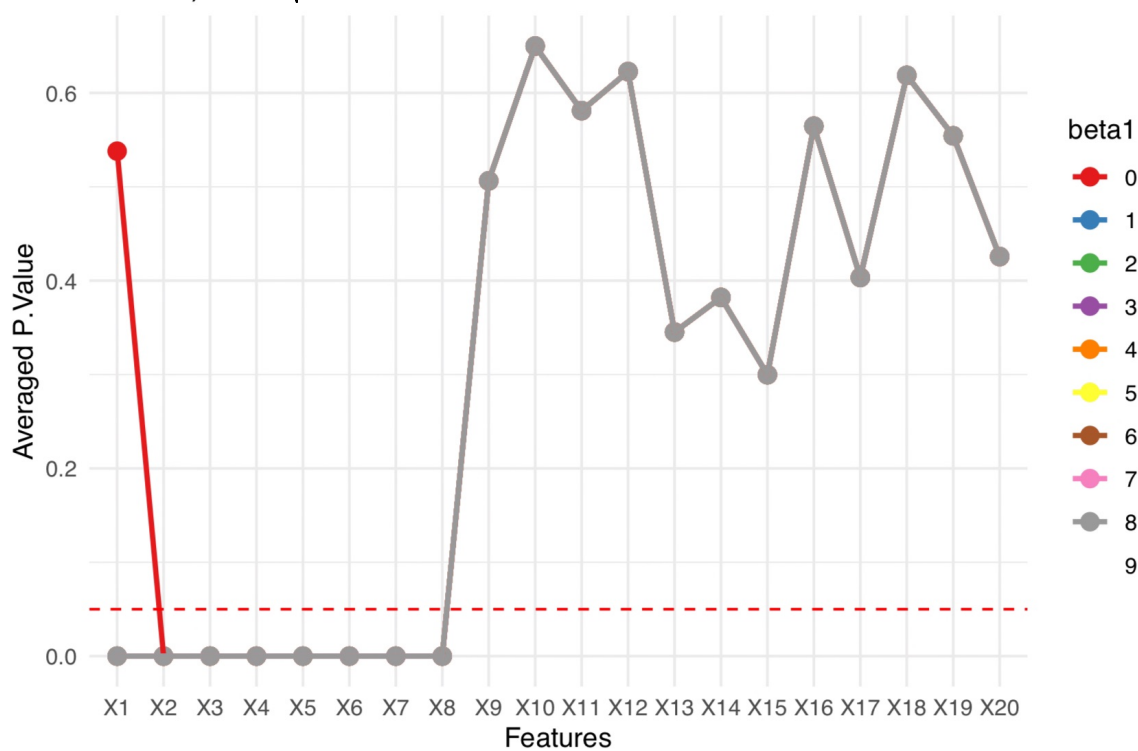
low

Case a): Independent with different β 's.



GCM.

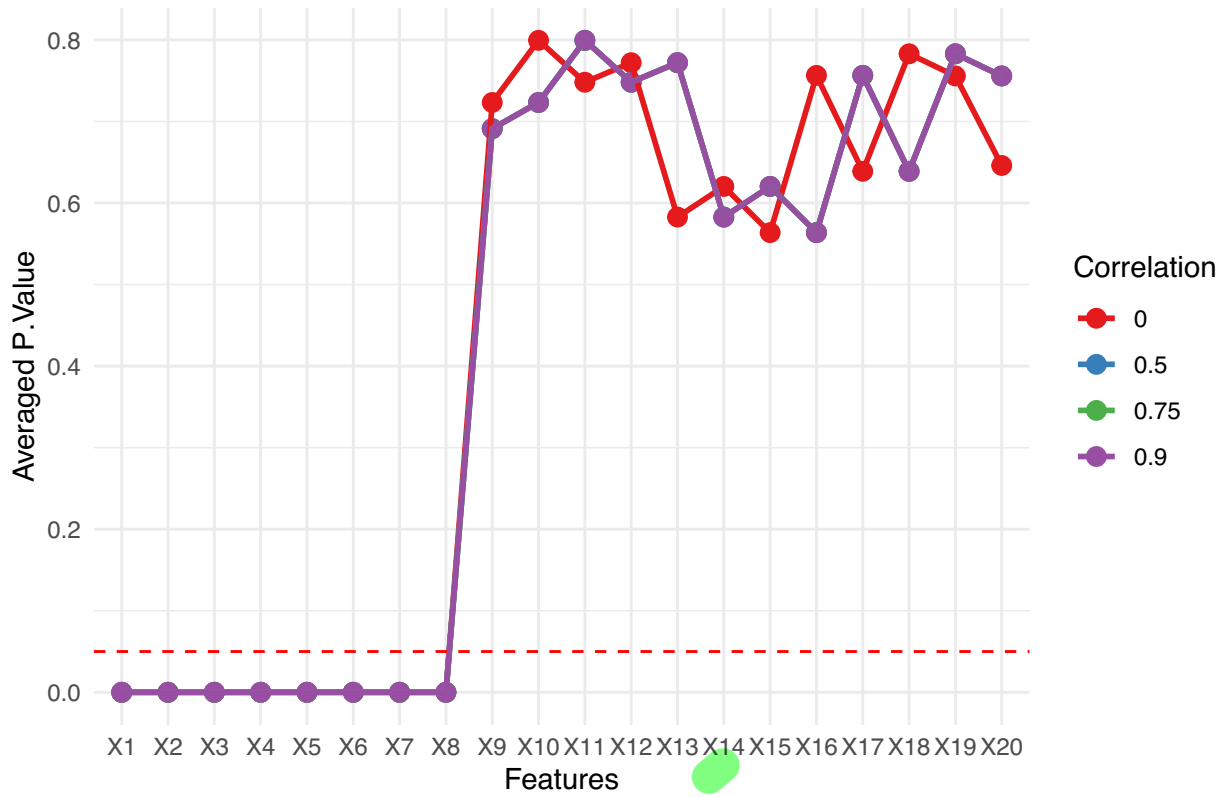
Case a): Independent with different β 's.



Logo			GCM	
beta1	Test_Statistics	P.Value	test.statistics	p.val
0	0.3532113	7.343320e-01	0.2871719	5.379729e-01
1	9.2390690	4.980586e-18	12.9828137	9.014338e-35
2	12.9446817	1.352523e-34	14.9029628	4.220358e-43
3	14.2989599	1.843078e-40	15.3583758	3.359217e-45
4	14.8824509	5.611967e-43	15.5250031	4.878816e-46
5	15.1757452	2.594804e-44	15.6024373	1.867992e-46
6	15.3410470	4.222792e-45	15.6441049	1.079780e-46
7	15.4423861	1.325032e-45	15.6688449	7.657123e-47
8	15.5085725	6.045860e-46	15.6846059	6.079686e-47
9	15.5539703	3.467126e-46	15.6951908	5.165308e-47

Low:

Case b):



Green:

Case b):

