Simulation

<model 3>

$Y_3 = \beta_1^T X\,(\beta_1^T X + \beta_2^T X + 1) + 0.2\varepsilon$

n = 100, p = 10

Case(1): $\beta_1 = (1, 0, \ldots, 0)^T$, $\beta_2 = (0, 1, 0, \ldots, 0)^T$

True beta 0의 개수 : 18개

Sparse dr

$\lambda_1 = (0.01, 0.01), \lambda_2 = 0.01$
slice 개수: 4개

method	p	corr1	corr2	mse1	mse2
dr	0.0	0.9023539	0.3582309	0.20441361	2.013343
sparse dr	8.4	0.9889003	0.5342424	0.02353643	2.259421

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.05$
slice 개수: 4개

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.9023539	0.3582309	0.2044136110	2.013343
sparse dr	16.33	0.9998277	0.4252261	0.0003724295	2.155955

$\lambda_1 = (0.1, 0.1), \lambda_2 = 0.05$
slice 개수: 4개

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.9023539	0.3582309	0.2044136	2.013343
sparse dr	17.86	1.0000000	0.2945666	0.0000000	2.037919

$\lambda_1 = (0.1, 0.1), \lambda_2 = 0.05$
slice 개수: 10개

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.8765027	0.4790111	0.2546006	2.121877
sparse dr	17.02	1.0000000	0.5038377	0.0000000	2.275580

Case(2): $\beta_1 = (1, 1, 0.1, 0.1, 0, \ldots, 0)^T$, $\beta_2 = (0, 0, \ldots, 0, 0.1, 0.1, 1, 1)^T$,

True beta 0의 개수 : 16개

Sparse dr

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.01$
slice 개수: 10개

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.8926849	0.7441008	0.7422822	2.360219
sparse dr	12.74	0.9386644	0.8530844	0.7038246	2.741271

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.01$
slice 개수: 4개

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.9117192	0.7576560	1.768800	2.670831
sparse dr	14.72	0.9835670	0.8561785	1.820555	3.141346

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.05$ slice 개수: 10개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.8951393	0.7440215	0.5933793	2.480356
sparse dr	12.95	0.9442555	0.8642252	0.5366405	2.887598

$\lambda_1 = (0.1, 0.1), \lambda_2 = 0.01$ slice 개수: 10개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.8969179	0.7303821	0.5876484	2.498324
sparse dr	16.43	0.8644084	0.7750632	0.6741271	2.900782

Case(3): $\beta_1 = (1, 1, 1, 1, 1\ 0, \ldots, 0)^T$, $\beta_2 = (0, 0, \ldots, 0, 1, 1, 1, 1, 1)^T$, True beta 0의 개수 : 10개	Sparse dr
$\lambda_1 = (0.05, 0.01), \lambda_2 = 0.01$ slice 개수: 4개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.3443642	0.3333781	2.565917	2.142812
sparse dr	8.77	0.6384969	0.3491921	1.921513	2.235067

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.01$ slice 개수: 4개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.2634347	0.3226514	2.381886	2.271132
sparse dr	12.79	0.5734163	0.2351197	2.275058	2.251113

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.05$ slice 개수: 4개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.2652045	0.3255123	2.338302	2.289543
sparse dr	12.76	0.5778242	0.2346929	2.155990	2.238162

$\lambda_1 = (0.1, 0.1), \lambda_2 = 0.01$ slice 개수: 10개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.3206840	0.2585343	2.150356	2.242556
sparse dr	8.71	0.7533963	0.1154713	1.717944	1.900907

<model 4>

$$Y_4 = \frac{\beta_1^T X}{0.5 + (\beta_2^T X + 1.5)^2} + 0.02\varepsilon$$

n = 400, p = 20

Case(1): $\beta_1 = (1, 0, \ldots, 0)^T$, $\beta_2 = (0, 1, 0, \ldots, 0)^T$
True beta 0의 개수 : 38개

Sparse dr

$\lambda_1 = (0.01, 0.01), \lambda_2 = 0.01$
slice 개수: 4개

method	p	corr1	corr2	mse1	mse2
dr	0.0	0.9910928	0.9601205	0.01791585027	1.568229
sparse dr	35.2	0.9999502	0.9978728	0.00009773017	1.536892

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.05$
slice 개수: 4개

method	p	corr1	corr2	mse1	mse2
dr	0	0.9910928	0.9601205	0.01791585	1.568229
sparse dr	38	1.0000000	1.0000000	0.00000000	1.537359

Case(2): $\beta_1 = (1, 1, 1, 0.1, 0.1, 0, \ldots, 0)^T$, $\beta_2 = (0, 0, \ldots, 0, 0.1, 0.1, 1, 1, 1)^T$,
True beta 0의 개수 : 30개

Sparse dr

$\lambda_1 = (0.01, 0.01), \lambda_2 = 0.01$
slice 개수: 4개

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.9902523	0.9397599	3.523601	1.263554
sparse dr	26.92	0.9979160	0.9792754	3.552670	1.291342

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.01$
slice 개수: 4개

method	p	corr1	corr2	mse1	mse2
dr	0	0.9903701	0.9401990	3.762007	1.301785
sparse dr	34	0.9953800	0.9606207	3.777331	1.339770

$\lambda_1 = (0.05, 0.01), \lambda_2 = 0.01$
slice 개수: 10개

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.9841425	0.9129147	3.751120	3.602607
sparse dr	22.47	0.9955477	0.9582296	3.777496	3.937488

Case(3): $\beta_1 = (1, 1, 1, 1, 1, 0, \ldots, 0)^T$, $\beta_2 = (0, 0, \ldots, 0, 1, 1, 1, 1, 1)^T$,
True beta 0의 개수 : 30개

Sparse dr

$\lambda_1 = (0.01, 0.01), \lambda_2 = 0.01$
slice 개수: 4개

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.9897923	0.9640755	3.982248	3.564794
sparse dr	29.52	0.9910237	0.9742756	4.090417	3.750457

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.01$ slice 개수: 4개	method p corr1 corr2 mse1 mse2 dr 0.00 0.9903003 0.9632674 3.821423 3.721649 sparse dr 30.02 0.9424159 0.7998194 3.850717 3.677173
$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.01$ slice 개수: 10개	method p corr1 corr2 mse1 mse2 dr 0.00 0.9861000 0.9708270 4.015291 2.217221 sparse dr 30.01 0.9803134 0.8855361 4.119591 2.346826
$\lambda_1 = (0.1, 0.01), \lambda_2 = 0.01$ slice 개수: 10개	method p corr1 corr2 mse1 mse2 dr 0.00 0.9860943 0.9702612 3.934985 1.977878 sparse dr 27.48 0.9057710 0.9781346 3.930187 2.069311

<model 5>

$Y_5 = (\beta_1^T X)^2 + 0.5\beta_2^T X + 0.2\varepsilon$

n = 200, p = 20

Case(1): $\beta_1 = (1, 0, \ldots, 0)^T$, $\beta_2 = (0, 1, 0, \ldots, 0)^T$ True beta 0의 개수 : 38개	Sparse dr
$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.01$ slice 개수: 10개	method p corr1 corr2 mse1 mse2 dr 0.00 0.9015751 0.6874325 0.24806573 2.213422 sparse dr 37.37 0.9997441 0.9519316 0.04492693 2.408697
$\lambda_1 = (0.1, 0.05), \lambda_2 = 0.05$ slice 개수: 10개	method p corr1 corr2 mse1 mse2 dr 0.00 0.9015751 0.6874325 0.24806573 2.213422 sparse dr 37.89 1.0000000 0.9519349 0.04433987 2.408707
$\lambda_1 = (0.1, 0.05), \lambda_2 = 0.05$ slice 개수: 4개	method p corr1 corr2 mse1 mse2 dr 0 0.9348252 0.7841413 0.1384839 1.764273 sparse dr 38 1.0000000 0.9703274 0.0000000 1.792192

Case(2): $\beta_1 = (1, 1, 1, 0.1, 0.1, 0, \ldots, 0)^T$, $\beta_2 = (0, 0, \ldots, 0, 0.1, 0.1, 1, 1, 1)^T$, True beta 0의 개수 : 30개	Sparse dr
$\lambda_1 = (0.01, 0.01), \lambda_2 = 0.05$ slice 개수: 4개	method p corr1 corr2 mse1 mse2 dr 0.0 0.9797262 0.4418520 3.94459 2.141691 sparse dr 21.8 0.9080583 0.3214264 3.81560 2.173087

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.01$ slice 개수: 4개	method p corr1 corr2 mse1 mse2 dr 0.00 0.9797424 0.4423434 3.866103 2.017269 sparse dr 35.74 0.9655623 0.1601148 3.940063 1.956685
$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.05$ slice 개수: 4개	method p corr1 corr2 mse1 mse2 dr 0.00 0.9807788 0.4662995 3.907071 1.948356 sparse dr 35.75 0.9690957 0.1473087 3.979200 1.956210
$\lambda_1 = (0.1, 0.05), \lambda_2 = 0.05$ slice 개수: 10개	method p corr1 corr2 mse1 mse2 dr 0.00 0.9537961 0.6943232 3.818503 2.039708 sparse dr 34.98 0.8542076 0.3208446 3.561178 1.926632

Case(3): $\beta_1 = (1, 1, 1, 1, 1, 0, \dots, 0)^T$, $\beta_2 = (0, 0, \dots, 0, 1, 1, 1, 1, 1)^T$, True beta 0의 개수 : 30개	Sparse dr
$\lambda_1 = (0.01, 0.01), \lambda_2 = 0.05$ slice 개수: 4개	method p corr1 corr2 mse1 mse2 dr 0.00 0.4316639 0.08454211 2.734656 1.885188 sparse dr 23.62 0.2203903 0.07986797 2.230414 2.014137
$\lambda_1 = (0.05, 0.01), \lambda_2 = 0.01$ slice 개수: 4개	method p corr1 corr2 mse1 mse2 dr 0.0 0.3597001 0.072620076 2.547514 1.912906 sparse dr 28.9 0.4886754 0.006923542 2.010319 1.940209
$\lambda_1 = (0.05, 0.01), \lambda_2 = 0.01$ slice 개수: 10개	method p corr1 corr2 mse1 mse2 dr 0.00 0.8012559 0.4122566 3.459842 1.909934 sparse dr 33.73 0.7214096 0.2596883 3.397723 1.915082
$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.05$ slice 개수: 4개	method p corr1 corr2 mse1 mse2 dr 0.00 0.3244805 0.06563743 2.462489 1.893912 sparse dr 34.49 0.5579383 0.09049100 2.653359 1.905140

<model 6>

$Y_6 = \log(|\beta_1^T X + 3|) * sign(\beta_2^T X) + 0.3\varepsilon$

n =300, p = 40

Case(1): $\beta_1 = (1, 0, \dots, 0)^T$, $\beta_2 = (0, 1, 0, \dots, 0)^T$ True beta 0의 개수 : 78개	Sparse dr

$\lambda_1 = (0.01, 0.01), \lambda_2 = 0.01$ slice 개수: 4개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.8124052	0.8924323	0.38268107	2.118174
sparse dr	63.78	0.9641079	0.9863830	0.07850886	2.110922

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.05$ slice 개수: 4개	

method	p	corr1	corr2	mse1	mse2
dr	0	0.8124052	0.8924323	0.3826811	2.118174
sparse dr	78	1.0000000	1.0000000	0.0000000	2.068330

Case(2): β_1 =(1,1,1,1,1,0.1,0.1,0.1,0.1,0.1,0.1,0,0…0,0) β_2 =(0,0…0,0,0.1,0.1,0.1,0.1,0.1,0.1,1,1,1,1,1) True beta 0의 개수 : 60개	Sparse dr
$\lambda_1 = (0.01, 0.01), \lambda_2 = 0.01$ slice 개수: 4개	

method	p	corr1	corr2	mse1	mse2
dr	0.0	0.7543497	0.5851777	3.563543	1.839152
sparse dr	54.1	0.8355395	0.7486166	3.798262	2.042167

$\lambda_1 = (0.05, 0.01), \lambda_2 = 0.01$ slice 개수: 4개	

method	p	corr1	corr2	mse1	mse2
dr	0.0	0.7543497	0.5851777	3.563543	1.839152
sparse dr	65.5	0.6691903	0.2604054	2.298235	2.618012

$\lambda_1 = (0.05, 0.01), \lambda_2 = 0.01$ slice 개수: 10개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.8885770	0.6775665	3.865197	1.949734
sparse dr	59.86	0.6949699	0.1764802	2.455619	2.154638

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.05$ slice 개수: 4개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.7491676	0.5905225	3.530537	1.787060
sparse dr	77.03	0.3288655	0.2936073	2.718157	2.003606

Case(3): β_1 =(1,1,1,1,1,1,1,1,1,1 ,0,0…0,0) β_2 =(0,0…0,0,0,1,1,1,1,1,1,1,1,1,1) True beta 0의 개수 : 60개	Sparse dr
$\lambda_1 = (0.01, 0.01), \lambda_2 = 0.01$ slice 개수: 4개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.7155065	0.6013300	3.46307	1.747512
sparse dr	50.58	0.7519425	0.6298458	3.75939	1.943649

$\lambda_1 = (0.05, 0.01), \lambda_2 = 0.01$ slice 개수: 4개	

method	p	corr1	corr2	mse1	mse2
dr	0.0	0.7155065	0.6013300	3.463070	1.747512
sparse dr	64.1	0.4957000	0.2649962	2.674059	2.117620

$\lambda_1 = (0.05, 0.05), \lambda_2 = 0.01$ slice 개수: 10개	

method	p	corr1	corr2	mse1	mse2
dr	0.00	0.7817200	0.6492801	3.670312	1.799867
sparse dr	77.14	0.4157279	0.3233558	3.093285	1.906111