data generating model:

C: clinical factor

, , q1=10, b is generated from unif (1, 2.2)

E: environmental factor

, , q1=4, is generated from unif (1.2, 2.5)

G: genes

, , P=100, the nonzero is generated from unif(1, 2.5) and other is 0.

#nonzero: 5

W: GxE interactions

,

the nonzero are generated from unif(1, 2.5) and other is 0.

#nonzero: 12

Estimate the coefficients of and with marginal model:

, (),

Simulation Results

Bayesian Lasso (n=100, p=100)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean | 1.233333 | 0 | 2.233333 | 2.433333 |
| sd | 0.8583598 | 0 | 1.304722 | 2.473073 |

Bayesian Lasso Spike and Slab (n=200, p=100)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean | 3.133333 | 0 | 3.933333 | 0.3666667 |
| sd | 1.195778 | 0 | 1.362891 | 0.8502873 |

LAD Bayesian Lasso (n=100, p=50)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean | 3.566667 | 0.9 | 5.3 | 2.066667 |
| sd | 0.9352607 | 0.9948141 | 1.784029 | 1.311312 |

LAD Bayesian Lasso spike and slab (n=100, p=50)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean | 1.166667 | 0 | 2.366667 | 0.3333333 |
| sd | 0.9498941 | 0 | 1.564329 | 0.5466723 |

n=100, p=100

Bayesian Lasso (n=100, p=100)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean | 1.233333 | 0 | 2.233333 | 2.433333 |
| sd | 0.8583598 | 0 | 1.304722 | 2.473073 |

Bayesian Lasso Spike and Slab

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean | 3.133333 | 0 | 3.933333 | 0.3666667 |
| sd | 1.195778 | 0 | 1.362891 | 0.8502873 |

LAD Bayesian Lasso (n=100, p=100)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean | 3.466667 | 1.233333 | 5.1 | 3.9 |
| sd | 1.041661 | 1.135124 | 1.66816 | 2.264417 |

LAD Bayesian Lasso spike and slab (n=100, p=100)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean | 1.266667 | 0.03333333 | 2.133333 | 0.3333333 |
| sd | 1.048261 | 0.1825742 | 1.407696 | 0.5466723 |

n=100, p=200

Bayesian Lasso

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean | 1.233333 | 0 | 2.433333 | 3.433333 |
| sd | 1.040004 | 0 | 1.50134 | 4.048698 |

Bayesian Lasso Spike and Slab

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean | 2.866667 | 0 | 4.333333 | 0.5 |
| sd | 1.136642 | 0 | 1.49328 | 0.7310833 |

LAD Bayesian Lasso

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean |  |  |  |  |
| sd |  |  |  |  |

LAD Bayesian Lasso spike and slab

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | TP(main) | FP(main) | TP(interaction) | FP(interaction) |
| mean |  |  |  |  |
| sd |  |  |  |  |