Simulation Results

2026-02-02

Simulation Setup

This simulation is performed with $n = 100$ and $d = 2$, using the 2-d lattice as the underlying graph. $s = 1$ parameters are set to be nonzero, and the beta parameter is chosen to be $\beta = 0$. The attached results are for a 2-replication simulation. The parameter vector θ has sparse components other than the following:

Parameter.Index	Value
1	-1

but for brevity, our simulation only estimates the indices of θ in $\mathcal{C} = \{\ 1,\ 1\}$ elements of θ. Accordingly, **all statistics and visuals are indicative of performance only on the set $\mathcal{C}$.**

The results from our code are not augmented with any comparison method here.

The attached results include the mean-squared error for each parameter estimate, as well as boxplots for a selection of nonzero and zero-valued parameters. In the boxplots, the green line represents the true value of the estimated parameter.

After these, I show coverage statistics for 95% symmetric confidence intervals for each of the parameters.

Results

Mean-squared error comparison

Table 1: Mean-Squared Error of Parameter Estimates

	proposed
theta[1]	0.236
theta[1]	0.236
total	0.236

Table 2: Mean-Squared Error of First-Step Parameter Estimates

	proposed
theta[1]	0.842
theta[1]	0.842
total	0.842

Mean absolute deviation comparison $(\frac{1}{n.sim}\sum_{i=1}^{n.sim} \frac{1}{|\mathcal C|}\|\hat

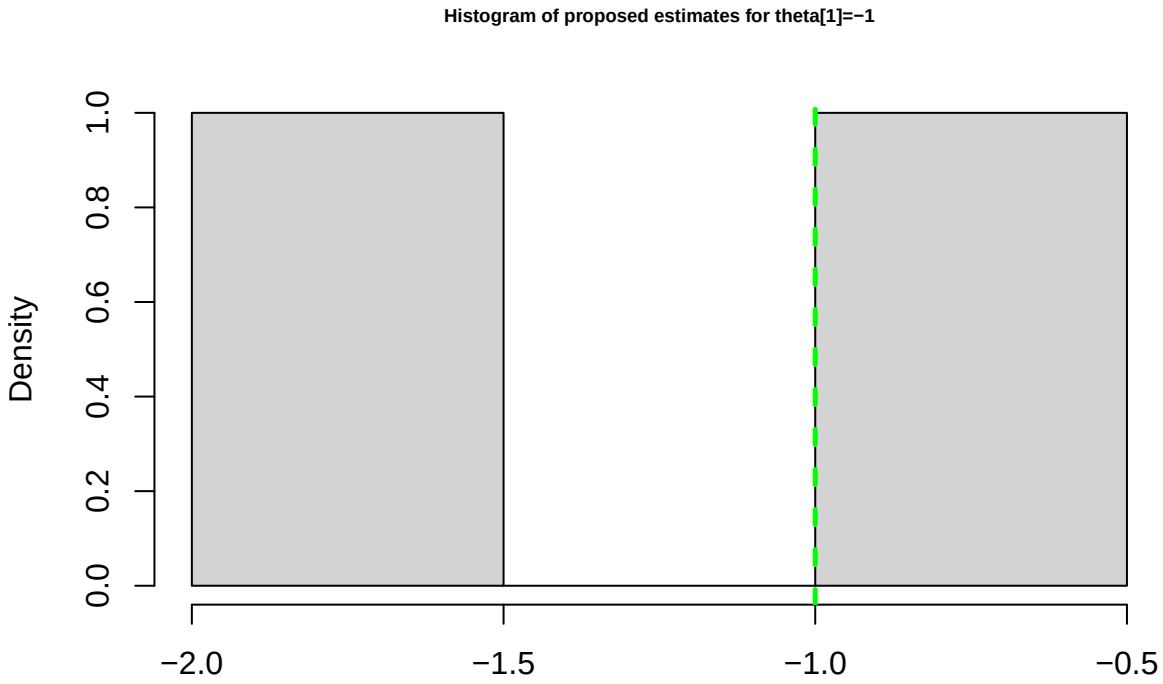
Table 3: Mean Absolute Deviation of Parameter Estimates

	proposed
theta[1]	0.441
theta[1]	0.441
total	0.441

Table 4: Mean Absolute Deviation of First-Step Parameter Estimates

	proposed
theta[1]	0.651
theta[1]	0.651
total	0.651

Boxplots


Histogram of proposed estimates for theta[1]=−1
Density
0.0
0.2
0.4
0.6
0.8
1.0
−2.0
−1.5
−1.0
−0.5

Statistics and 95% Confidence Intervals from per-Replicate Estimates

Statistics for Theoretical 95% Confidence Intervals