MEC Structural Hamming Distance by Method

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Figure 1: Structural Hamming distance (SHD) between Markov equivalence classes (MEC) of recovered and ground truth graphs. **LOGLL** stands for NOTEARS method with log-likelihood and quasi-MCP, **L2** stands for NOTEARS method with least square and ℓ_1 .

General Linear Model with Binary Output (Logistic Model)



Figure 2: Structural Hamming distance (SHD) for Logistic Model, Row: random graph types, {SF, ER}-k= {Scale-Free,Erdős-Rényi } graphs. Columns: kd expected edges. NOTEARS_LOGLL uses log-likelihood with quasi-MCP, NOTEARS use log-likelihood with ℓ_1 . Error bars represent standard errors over 10 simulations.

Methods	SHD	Number of Edges
NOTEARS-Nonlinear-LOGLL(Our)	14	14
NOTEARS-Linear	22	18
<code>NOTEARS-Nonlinear-ℓ_2</code>	16	13

Table 1: Experiments on real dataset from [1] which is used in [2]. This dataset is commonly used as a benchmark as it comes with a consensus network that is accepted by the biological community. The dataset consists of n = 7466continuous measurements of expression levels of proteins and phospholipids in human immune system cells for d = 11cell types. Our method achieve the best performance on the real dataset application.

- Sachs, Karen, et al. "Causal protein-signaling networks derived from multiparameter single-cell data." Science 308.5721 (2005): 523-529.
- [2] Zheng, Xun, et al. "Learning sparse nonparametric dags." International Conference on Artificial Intelligence and Statistics. Pmlr, 2020.