Tree Normal Approximators

1 Why

TODO change name? should be something about approximating a normal.

What is the best tree density approximant to a normal density? What is the

2 Result

Proposition 1. *Let g be a normal density with mean $\mu \in \mathbf{R}^d$ and covariance $\Sigma \in \mathbf{S}^d_{++}$. Let T be a Chow-Liu tree of g. Let f be a gaussian density with mean μ and precision matrix P where*

- $P_{11} = \Sigma_{11}^{-1} + \sum_{pa_j=1} \Sigma_{j1}^2 \Sigma_{11}^{-2} \Sigma_{j|1}^{-1}$

- *for $i = 2, \ldots, d$, $P_{ii} = \Sigma_{i|pa_i}^{-1} + \sum_{pa_j=i} \Sigma_{ji}^2 \Sigma_{ii}^{-2} \Sigma_{j|i}^{-1}$*

- $i, j = 1, \ldots d$ *and* $i = pa_j$, $P_{ij} = P_{ji} = -\Sigma_{ji} \Sigma_{jj}^{-1} \Sigma_{j|i}^{-1}$

Then f is Chow-Liu density of g.

Proof. □