



## Tree Normals

### 1 Why

We name multivariate normal densities which factor according to a tree. These densities require tabulating fewer numbers.

### 2 Definition

A *tree multivariate normal* or *tree normal* density is a multivariate normal density which factors according to a tree.

#### 2.1 Fewer numbers

A multivariate normal on  $\mathbf{R}^n$  requires tabulating  $n$  numbers for the mean and  $n(n+1)/2$  numbers for the covariance matrix. If it factors according to a tree, we need only  $n$  numbers to specify the covariance (one for the one-variable marginal, and  $n-1$  for the covariance of the two-variable conditionals).