



## TREE DENSITIES

### Why

As with distributions, if a density factors according to a tree rooted at a particular vertex, it factors according to a tree rooted at any vertex. So, as before, the property of factoring according to a rooted tree is really a property of factoring according to a tree.

### Definition

#### Defining Result

**PROPOSITION 1.** *If a density factors according to a tree rooted at a vertex it factors according to that tree rooted at any vertex.*

*Proof.* TODO

□

### Undirected Definition

A density *factors according to a tree* if it factors according to the tree rooted at any vertex.

### Existence and Uniqueness

Trees are not a property of densities, since there is no one-to-one correspondence, as demonstrated by the following propositions.

## Existence

PROPOSITION 2. *A density  $f$  need not factor according to a tree.*

## Uniqueness

PROPOSITION 3. *A density  $f$  may factor according to multiple trees.*

