



## 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

**Prop. 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

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

### Uniqueness

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

