



Tree Densities

1 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.

2 Definition

2.1 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

□

2.2 Undirected Definition

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

3 Existence and Uniqueness

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

3.1 Existence

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

3.2 Uniqueness

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