We use this model to understand how the LDA results based on LIDAR data relate to diameter distribution of trees.

We estimate for the full field transect or plot by calculating the weighted average of all thetas in all 25 x 25 m LIDAR plots crossed by the transect or plot. The weights in this average depends on the area of the transect or plot that intersects with the 25 x 25 m LIDAR plot. Then, we estimate (the diameter distribution of each group) while keeping fixed. We will use all the data but we will scale the number of trees 10<DBH<35 cm in the correct way to get the correct diameter distribution. Notice that our unit is the full transect or full plot.

The main assumption here is that the trees will follow the same distribution as the elements in the LIDAR dataset. One of the problems with this assumption is that LIDAR captures information from samples that hit the ground and of trees < 10 cm. As a result, it might not be realistic to assume that data on trees > 10 cm will have the same distribution as the elements in the LIDAR dataset, particularly for areas that are very open or that just have understory plants/trees (i.e., have many observations coming from the ground or from trees < 10 cm).

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We assume that

Where

And was previously estimated (e.g., either by fitting the full LDA model or by using the folding-in operation).