**Model description**:

Say we have 3 activity centers (AC), 20 grid cells, and 10 time segments. Each time segment is associated with a given vector of parameters . Our goal is to identify the location of these AC’s based on the observed visitation frequency.

Subscripts:

l = grid cell

t = time segments

i = observation within time segment

k = AC

We assume that:

Where

where and is the distance between location l and activity center k.

The observed data corresponds to the number of times the animal was seen in location l during time segment t where .

Notice that

As a result, we can integrate over to obtain:

**Priors**:

We assume a uniform prior over the set of locations that were visited at least once for activity center k. Furthermore, we assume that:

To determine the number of activity centers, we adopted a truncated stick-breaking prior on **:**

**FCD’s**:

* Location of activity center

where are a set of coordinates for one of the potential locations.

We will sample this using a categorical distribution

This implies that: