

Lab 1: Introduction

This session is about reading in, displaying and summarising point patterns. The lecturer's R script is available [here](#) (right click and save).

If you have not already done so, you'll need to start R and load the **spatstat** package by typing

```
library(spatstat)
```

Exercise 1

We will study a dataset that records the locations of Ponderosa Pine trees (*Pinus ponderosa*) in a study region in the Klamath National Forest in northern California. The data are included with **spatstat** as the dataset **ponderosa**.

1. assign the data to a shorter name, like **X** or **P**;
2. plot the data;
3. find out how many trees are recorded;
4. find the dimensions of the study region;
5. obtain an estimate of the average intensity of trees (number of trees per unit area).

Exercise 2

The Ponderosa data, continued:

1. When you type `plot(ponderosa)`, the command that is actually executed is `plot.ppp`, the plot method for point patterns. Read the help file for the function `plot.ppp`, and find out which argument to the function can be used to control the main title for the plot;
2. plot the Ponderosa data with the title *Ponderosa Pine Trees* above it;
3. from your reading of the help file, predict what will happen if we type

```
plot(ponderosa, chars="X", cols="green")
```

then check that your guess was correct;

4. try different values of the argument `chars`, for example, one of the integers 0 to 25, or a letter of the alphabet. (Note the difference between `chars=3` and `chars="+"`, and the difference between `chars=4` and `chars="X"`).

Exercise 3

The following vectors record the locations of 10 scintillation events observed under a microscope. Coordinates are given in microns, and the study region was 30×30 microns, with the origin at the bottom left corner.

```
x <- c(13, 15, 27, 17, 8, 8, 1, 14, 19, 23)
y <- c(3, 15, 7, 11, 10, 17, 29, 22, 19, 29)
```

Create a point pattern **X** from the data, and plot the point pattern (use **owin** or **square** to define the study region).

Exercise 4

The file **anthills.txt** is available in the Data directory on GitHub and downloadable by this direct link (right click and save).

It records the locations of anthills recorded in a 1200x1500 metre study region in northern Australia. Coordinates are given in metres, along with a letter code recording the ecological ‘status’ of each anthill (in this exercise we will ignore this letter code).

1. read the data into R as a data frame, using the R function **read.table**. (Since the input file has a header line, you will need to use the argument **header=TRUE** when you call **read.table**.)
2. check the data for any peculiarities.
3. create a point pattern **hills** containing these data. Ensure that the unit of length is given its correct name.
4. plot the data.