STAT 40830: Homework 1

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1 The Dataset

I have chosen to use the Growth of Orange Trees data set which contains age and trunk circumference measurements for 5 orange trees over a number of years.

The data set contains 3 variables

- *Tree*: An indicator of the tree on which the measurements were taken.
- *age*: The age of the tree measured in days since 1968-12-31.
- *circumference*: The circumference of the tree in mm.

2 Graph

In the below graph I have plotted the age and circumerference of each of the trees at each measurement interval.

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`geom_smooth()` using formula = 'y ~ x'
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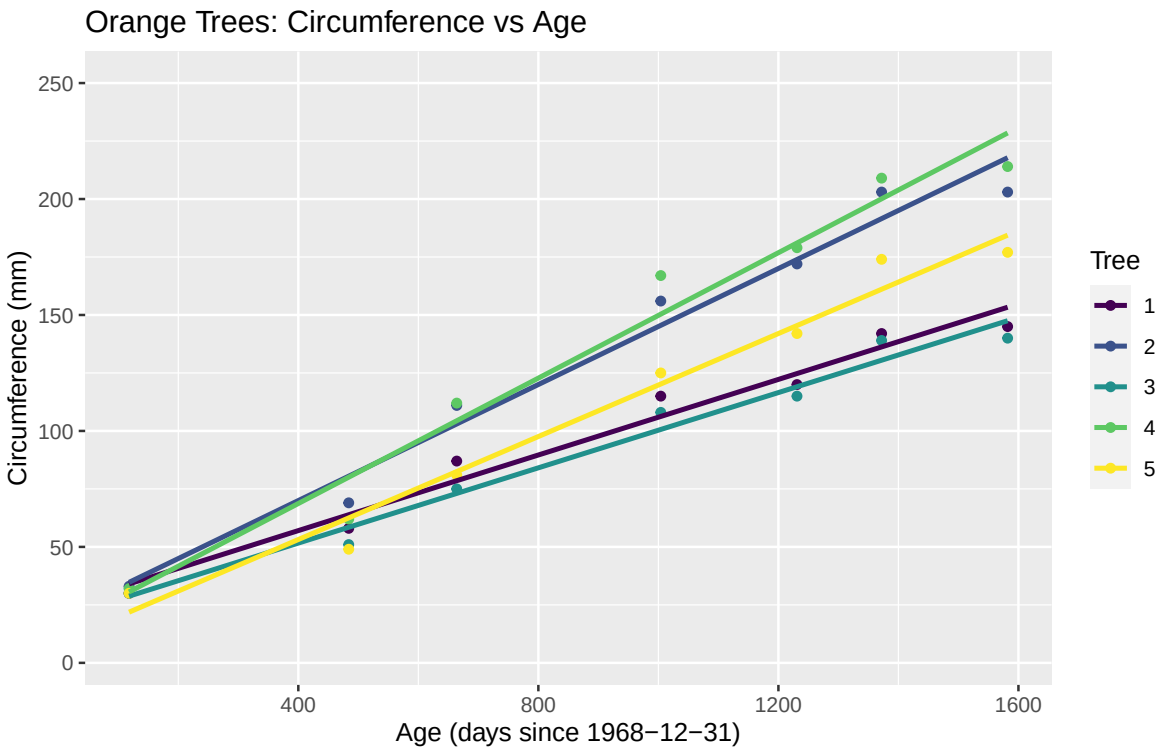

Figure 1: Growth of Orange Trees

It is clear that while all of the orange trees started at a similar size, each tree has grown at a different rate. The circumference of **Tree 4** has increased the most over the observation period, with a final circumference of 214. In contrast **Tree 3** has grown the least over the observation period.

It is also obvious from the plot that the growth in circumference of the orange trees is not linear with age. While at younger ages this appears to be somewhat true, across the last 4 measurement periods there are plateaus in the graph. This indicates that very little growth occurred in any of the trees particularly between the ages of 1372 and 1582 days. Further investigation would be required to determine if this slowdown in growth is related to the age of the trees or if could be caused by other environmental factors such as weather.