Scientific Computing :: Drop In

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Session: 1
Date: 31 August 2018
Activity: R Coding

Growth rates

Download the small data set `Clg1_5000` from `https://github.com/apommerening`. The ASCII file has 45 observations relating to the stem analysis of Sitka spruce tree # 5000 from Clocaenog Forest in North Wales (UK). As part of a stem analysis stem discs are extracted from a felled tree to reconstruct past growth. The analysis provided data on tree height (h), stem diameter (dbh) and stem volume (v) by tree age which are now in the aforementioned file.

Your task is to write an R script which calculates relative growth rates (RGR) initially for dbh (but also try height and volume later), visualises RGR over time and displays a trend line.

RGR is commonly defined as $\log y_t - \log y_{t-1}/\Delta t$ where y is an arbitrary growth characteristic and time or age t is assumed to be discrete. The Chapman-Richards growth function for RGR is given by $bc(1 - e^{-bt})^{-1}$.

Reference

Pommerening, A. and Muszta, A., 2016. Relative plant growth revisited: Towards a mathematical standardisation of separate approaches. *Ecological Modelling* **320**, 383-392 (available on `www.pommerening.org`).