**FOREST MODELS – Modules 3/4**

**Site productivity, Site index Curves and Growth Functions**

Questions 1, 2 and 3 must be solved in EXCEL, while question 4 can be answered in WORD (or EXCEL). Upload the solutions to the Dropbox **Sunday 18th October until 23:59** and send me the link by email.

Homework received past the established deadline will be penalized proportionally to the delay.

(file names: *Student’s name\_homework3*.xlsx/docx)

1. Use the growth data from permanent plots of eucalyptus that you used for the exercise 3.7 from class and use the solver function from EXCEL to fit the Lundqvist function for basal area formulated as a difference equation considering k as the site specific parameter

$$G\_{2}=A\left(\frac{G\_{1}}{A}\right)^{\left(\frac{t\_{1}}{t\_{2}}\right)^{m}}$$

1. Combine this method with the one that expresses parameters as a function of site and/or stand variables and test having:

a) A expressed as a function of site index

b) m expressed as a function of stand density

c) A expressed as a function of site index and m as a function of stand density (*look at Globulus 2.1 and 3.0 equations for inspiration.*

Which do you think could be the best model 3.1, 3.2 a), b) or c) and why?

1. Suppose that the same method described in 2.1 was applied to dominant height and the function below was obtained:



 What is the site index (S) of a 5 years old stand with a dominant height equal to 10 m (use a base age of 10 years)? (Present the calculus)

1. Comment the following sentence: “*Climate, soil, and genetic potential determine natural limits on site productivity, whereas stocking determines the degree to which this limit is achieved*.”