**FOREST MODELS – Module 2**

**Data available for growth studies**

**The students must solve both problems using EXCEL and submit the solutions by email (email subject = Homework 2). One single file should be provided with each exercise in its corresponding spreadsheet (EXCEL file name: *Student’s name\_homework2*.xlsx)**

1. Stand table projection – uneven-aged stand of maritime pine in the Oleiros county

Table 1 contains data (available at the EXECL file “2.Data4GrowthStudies\_HW2-data.xlsx \ sheet: StandTable”) that were obtained during a forest inventory made in an uneven-aged stand of maritime pine located in Oleiros county.

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| Table 1. Diameter distribution and current 5 years increment in a maritime pine stand in the Oleiros county |
| diameter class j (5 cm) | Nj2020 mortality discounted | d increment id5 (cm) |
|
| ingrowth |  30 |   |
| 5 | 380 | 1.72 |
| 10 | 300 | 2.00 |
| 15 | 340 | 3.09 |
| 20 | 190 | 3.55 |
| 25 | 390 | 3.60 |
| 30 | 210 | 4.83 |
| 35 | 80 | 5.44 |
|  | 1890 |  |

1. Assuming an ingrowth of 30 trees into the first diameter class, compute the stand table for the year 2025.
2. Use the equations below to estimate the volume at the time of measurement and in 2025 and compute the current annual increment in volume for the 5 years period.

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| **Hipsometric** (units: d – cm; h – m) |
|  $h=\frac{d}{1.0643 + 0.0222\_{}d}$  |
| **Volume equation** (units: d – cm; h-m; v – m3) |
| $$v=0.01177+0.00003531\_{}d^{2}h\_{}$$ |

1. Stem analysis of a 74 years old maritime pine tree

During the harvest of some of the permanent plots from a thinning trial established in maritime pine stands in central Portugal, some of the dominant trees were selected for stem analysis. Make a graph with the evolution of the tree dominant height using Carmean’s method to estimate each one of the tree tips using the data made available in the EXCEL file “2.Data4GrowthStudies\_HW2-data.xlsx \ sheet: StemAnalysis” that contains, the number of rings counted in the discs extracted at several heights.