FOREST MODELS

3 Some topics related to tree and stand growth modeling – Exercises

1 Net growth of the standing volume, net growth, gross growth and ingrowth

1.1 Figure 1 shows summary data (stand level) of one of the stands from the National Forest of Leiria (pure and even-aged stand of maritime pine). This stand was measured with a periodicity of approximately 5 years from the age of 22.

a) Use the data from figure 1 to compute: net growth of the standing volume, net growth and gross growth for the periods 1985-1990 and 1990-1995. What data is missing to allow the computation of gross growth for the same periods?

b) Does it make sense to compute ingrowth for this stand (consider a d threshold of 7.5 cm)?

c) Estimate the site index for the stand (base age of 50 years)

d) Compute the total volume over time, considering that the stand was cleaned before the age of 22, by reducing the volume in 15 m^3 ha^{-1}.

e) Compute mean and current annual increment of the total volume and make the following graphs: total and standing volume; mean and current annual increment

		Stand variables (standing stand)						Thinnings		
		hdom	ddom	N	G	V	W	Nthin	Gthin	Vthin
year	t	m	cm	ha^{-1}	m^2 ha^{-1}	m^3 ha^{-1}	Mg ha^{-1}	ha^{-1}	m^2 ha^{-1}	m^3 ha^{-1}
1975	22	8.8	19.0	746	12.4	51.5	37.5			
1980	27	10.3	22.9	738	18.3	86.7	60.8			
1985	32	12.2	25.7	726	22.7	122.9	83.5			
1986	33							181	4.2	21.2
1990	37	14.1	29.4	506	22.6	139.8	93.2			
1991	38							141	5.2	30.1
1995	42	16.0	32.0	357	20.6	143.1	93.7			
2005	52	19.2	37.6	339	27.4	221.2	142.2			

Figure 1. Information from continuous forest inventory and from thinnings in a stand from the National Forest of Leiria

2 Allometric relationships

2.1 Data from destructive sampling of eucalyptus young trees representing different spacings and clones

a) Plot total biomass over diameter at 0.5 m, using different symbols according to the clone. Discuss the results

b) The same as a) but according to the spacing. Discuss the results, comparing them with the results obtained in a)