FOR 373: Assignment 4 – Systematic Sampling [60 points]

Notes: 2-pages of notes can be attached to this assignment and you are encouraged to use your calculator or Excel where necessary. You must show your work to receive any credit (e.g., the equation you use and any assumptions you make). Doing so also indicates whether you understand the method and help you receive partial credit, even if your final answer is incorrect.

1. How are populations typically arranged in forested landscapes? And what leads to this arrangement?

2. What do semi-variograms tell us about the relationship between your plots?

3. If the allowable error is given as a percent what measure of variation would you use to calculate sample size? Assume no calculation other than the sample size calculation.

4. You have been assigned to design a systematic continuing forest inventory sample protocol and present it to your boss. The only guidance he gives you is that there are 2,200 acres to inventory and that you need a sampling intensity of 0.5% of the acreage. You decide to give options of different size fixed radius plots, complete the table below in chains.

Plot Size	n	Square Spacing		Rectangular Spacing	
		L	B	L	B
1/50th acre					
1/20th acre					
1/10th acre					

5. Your boss in Question # 4 then asked you to pick and defend which plot size, n value, and spacing, you would choose? Remember to consider both efficiency and statistical validity in your decision.

6. From the following preliminary cruise statistics, determine how many plots you would need in order to estimate the mean volume per acre within the stand to within 9%, at 90% certainty. Assume the Stand is infinitely large.
   Mean = 900 cu ft/ acre   plots = 3 $1/20^{th}$ acre   standard deviation = 210 cu ft/ acre

7. You have a 75 acre stand that you put 26 1/10 acre plots on. The plots gave you a mean Vol/Acre of 800 cu ft and a SD of 105 cu ft/Acre. If you sell the stand for $320 / mbf, with 95% certainty what is the maximum gross value you would expect to receive?

8. Why are systematic samples often implemented in forestry instead of a random sample? What statistical assumptions must we make about systematic samples?