

Practical Problems – Logistic Growth Model

1. Consider the population of butterflies growing in a greenhouse in the local zoo. If the greenhouse is $100m^2$ and height is $10m$ and the number of butterflies can survive in $1m^2$ is ²⁰ The intrinsic growth rate is 0.2 per week.
 - a. What is the maximum possible population in the greenhouse?
 - b. If the butterfly population in January 2023 is 150 in the greenhouse, when does it achieve the carrying capacity?
 - c. If the death rate is 0.1, change the model accordingly and calculate (b) again.
2. Let's consider the population of deer in the streets in Trincomalee. The Department of Wildlife Resources sets guidelines for hunting in the district. Before the hunting season of 2024, it estimated a population of 900 deer. The Department of Wildlife Resources also reports the average number of deer per square kilometer is approximately 27. Suppose this is the deer density for the whole district (2,727 square kilometers).
 - a. Calculate the carrying capacity.
 - b. If the intrinsic growth rate is 0.24 per month draw the population for the next 12 months without hunting.
 - c. If the hunting rate is 0.4, draw the population again in the same graph.
 - d. Suppose the hunting season is from March to April. Calculate the population by the end of August 2024.