

BIO 480 Exam 1 Topics

Text Chapter 1: Sections 1.1, 1.2, 1.4, 1.5

Text Chapter 2: Sections 2.1 – 2.4

Text Chapter 3: Sections 3.2, 3.3, 3.6

Intro to models

- What is a model?

- Different forms of models

 - Physical vs Abstract

 - Empirical vs Mechanistic

 - Static vs Dynamic

- Model uses

- Model solutions

 - Analytical

 - Numerical

- What is a “good” model?

- No programming questions (yet!)

Exponential growth model (Simple population growth model)

- Model description (equation)

- Model solution, initial time and N

- Solution behavior

- Model strengths/weaknesses

The Modeling Process - I

- Basic steps

- Classic approach vs Alternative approach

Logistic growth model

- Density dependent vs density independent models

- Model description

 - Carrying capacity

- Solution behavior

 - N near zero, N near K, N above K

- Model strengths/weaknesses

The Modeling Process - II

- Model diagrams

 - Block diagrams

 - Forrester Diagrams

 - Basic components

 - Example models from Ch 3

- Multiple state variables (multiple compartment models)

- State variable units and dimensional analysis

Predator - Prey Two species model

- Model description (equations), Forrester diagram

 - Parameters (r, a, b, d) (meaning, effects)

- Model behavior

- Model weaknesses?

Romeo & Juliet (Two population model)

- Model description (equations)

 - Parameters (a, p) (meaning, effects)

- Model behaviors for different values of parameters