Research Topic (3)

Title: Constant-Harvest Model

Write research on:

Ordinary Differential Equations "ODE" is a tool to model different engineering, physical and biological systems. Let's apply one of these methods to solve a very important problem in the field of **population of fishery**.

Constant-Harvest Model. A model that describes the population of a fishery "P" in which harvesting takes place at a constant rate "H" is given by

$$\frac{dP}{dt} = kP - h,$$

where k and h are positive constants. This equation is called Constant-Harvest Model.

The research should include:

1- Introduction about Ordinary differential equation.

2- List essential equations to solve initial value problem using Laplace transform

3- Discuss the constant –Harvest Model an explain the meaning of each term in the equation.

4- Solve the Constant-Harvest Model, Solve the DE subject to $P(0) = P_0$

5- Describe the behavior of the population P(t) for increasing time in the three cases:

A) $P(0) > h/k$

B) $P(0) = h/k$

C) $P(0) < h/k$

6- Use results from part **B** to determine whether the fish population will ever go to extinct in finite time, that is, whether there exists a time $T>0$ such that $P(T)=0$. If the population goes to extinct, then find T.

7- Graph P(t) versus time t. Your graph must show the three cases mentioned in question number 5.

8- Conclusion

9- References

NB:

The form of the research should follow the following rules:

a. Writing using Microsoft Word.

b. using Time New Roman font.

c. 14 Font size for text and 16 Bold for the title.

d. single space between the lines.

e. Page margins are 2.5 cm from top, bottom, right and left.

f. The number of pages is not less than 5 or The number of words is not less than 400.

h. English language formulation should be correct and sound.

i. Clarity of texts, pictures or drawings.

With My Best Wishes,
Prof. Ali Elnaem,
Dr. M. Abdel-Aziz