

5. A population of rabbits on an island is studied over a period of time. The number of rabbits is modelled by the differential equation

$$\frac{d^2R}{dt^2} + 3\frac{dR}{dt} + 2R = 4t \quad t \geq 0$$

where t is the time, in years, from the start of the study and R is in hundreds of rabbits.

At the start of the study, there are 2000 rabbits on the island and the number of rabbits is increasing at a rate of 500 rabbits per year.

- (a) Determine, according to the model, the number of rabbits that there will be on the island, 10 years after the start of the study.

(9)

- (b) Give a limitation of the model.

(1)