

The pair of coupled ODEs

$$\frac{dx}{dt} = Ax - Bxy$$

$$\frac{dy}{dt} = -Cy + Dxy$$

is referred to as the Lotka-Volterra equation and is supposed to represent the evolution of the populations of a predator and its prey as a function of time. ( $A$ ,  $B$ ,  $C$ ,  $D$  are positive constants.)

(a) Which of the variables,  $x$  or  $y$ , represents the predator?

Which represents the prey? What reasons do you have for your choice?

(b) What do the parameters  $A$ ,  $B$ ,  $C$ , and  $D$  represent?

Why do you say so?

(c) Are there values for the populations that would lead to a stable solution for both groups?