

# MAPM312 Project - Parabolic PDEs

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# 1 Introduction

## 1.1 Problem Statement

The following set of coupled partial differential equations will be analysed at the hand of the FTCS model:

$$\begin{aligned}\frac{\partial u}{\partial t} &= D_u \frac{\partial^2 u}{\partial x^2} + u(1 - u) - \frac{auv}{1 + \lambda u} \\ \frac{\partial v}{\partial t} &= D_v \frac{\partial^2 v}{\partial x^2} - \frac{v}{ab} + \frac{auv}{b(1 + \lambda u)}\end{aligned}$$

$$\begin{aligned}a &\leq x \leq b, \quad 0 \leq t \\ u_x(a, t) &= 0, \quad u_x(b, t) = 0\end{aligned}$$

## 2 Derivation

### 3 Stability Analysis

## 4 Results

## 5 Discussion

## 6 Conclusion