1. Richardsons model

(Mooney and Swift project 5.2, part 2, page 311)
The state variables x and y are the annual rates of expenditure, and we suppose the rates of expenditure depend positively on the expenditure of the other country (with coefficients a, b) and negatively on ones own expenditure (with coefficients m, n, so that your expenditure would decay exponentially if the other country stopped spending). If we further assume there are underlying grievances r and s that drive an increase in expenditure even in the absence of spending by the other country: then we get

$$\frac{dx}{dt} = ay - mx + r \qquad \frac{dy}{dt} = bx - ny + s$$

This project will look at part 2 a), b), c), d) from the book.