

Errors in notes of uke 45

page 1

formula should be

$$\frac{\beta I_0}{(\beta + \gamma + \mu)I_0 + (\beta - (\beta + \mu + \gamma))I_0} e^{-\beta t}$$

page 5 Zero isocline for  $I' = 0$  should include  $I = 0$

endemic equilibrium, error in first coordinate, should be

$$p = \left( \frac{\gamma + \mu}{\beta}, I^* \right)$$

page 9

$g(I_M)$  in equations should be  $g(I_H)$

page 16

second equation should be  $y' = x^2(1 - y) - c_2 y$

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formula for E should be  $E = \frac{\rho \gamma (1 - \frac{\gamma}{\beta})}{\nu \rho + \rho(\nu + \gamma)}$

## EXERCISES.

In the following exercise find zero-isoclines, equilibria and their type and do sign analysis of the right hand sides and conclude something about the general behaviour of the system. Do computer experiments for each different type of phase portrait.

Exercise, Do an analysis of one dimensional system

$$S' = -\beta I^a S^b + \gamma I \quad I' = \beta I^a S^b - \gamma I$$

Start with the case  $a=2, b=1$ .

Exercise, Do an analysis of one dimensional system

$$S' = \frac{-\beta IS}{\alpha + I} + \gamma I \quad I' = \frac{\beta IS}{\alpha + I} - \gamma I$$

Exercise, Do an analysis of two dimensional system

$$S' = -\beta I^2 S + \rho R + \mu - \mu S \quad I' = \beta I^2 S - (\mu + \gamma) I \quad R' = \gamma I - \mu R - \rho R$$

Exercise, Do an analysis of two dimensional system

$$S' = \frac{-\beta IS}{\alpha + I} + \rho R + \mu - \mu S \quad I' = \frac{\beta IS}{\alpha + I} - (\mu + \gamma) I \quad R' = \gamma I - \mu R - \rho R$$

Start with case  $\rho = 0$