1. Homework Assignment
Dynamical Systems III
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http://dynamics.mi.fu-berlin.de/lectures/
due date: Wednesday, 22.04.2015

Problem 1:   Consider the following system of ODEs

$$\begin{aligned}
\dot{x} &= -y + \alpha y^2 + \beta x^2 y, \\
\dot{y} &= x - \gamma y^2 + \delta xy - y^3.
\end{aligned}$$

Discuss the stability of the equilibrium $(x, y) = (0, 0)$ depending on the parameters $\alpha, \beta, \gamma, \delta$.

Problem 2:   Write the system

$$\begin{pmatrix} \dot{x} \\ \dot{y} \end{pmatrix} = \begin{pmatrix} 1 & 2 \\ -1 & -1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} + \frac{6}{\sqrt{3}} \begin{pmatrix} 0 \\ xy \end{pmatrix}$$

in complex form $\dot{z} = f(z) = g(z, \bar{z})$, $z \in \mathbb{C}$.