

## INTRODUCTION TO BIFURCATION THEORY

*Exercises 28-11-2013*

**35.** (4 points) Consider a system  $\dot{X} = F(X)$ ,  $X \in \mathbb{R}^n$ . Show that if equilibrium  $\hat{X}$  is hyperbolic then the determinant of the Jacobian of the system evaluated at  $\hat{X}$  is not zero. It is enough to consider the case where  $n = 2$ .

**36.** (6 points) Consider

$$\dot{x} = -xy - x^6$$

$$\dot{y} = -y + x^2$$

Determine the stability of the equilibrium at the origin.