Universitatea Babeș-Bolyai, Facultatea de Matematică și Informatică

Secția: Informatică engleză Curs: Dynamical Systems

Primăvara 2024

Seminar 5

1. We consider the linear planar systems

a)
$$\dot{x} = -y$$
, $\dot{y} = 5x$; b) $\dot{x} = -x$, $\dot{y} = 5y$;

c)
$$\dot{x} = -3x$$
, $\dot{y} = -2y$; d) $\dot{x} = x - y$, $\dot{y} = x + y$.

- (i) Decide the type and stability of the equilibrium point at the origin.
- (ii) Decide whether it has a global first integral.
- (iii) Find a first integral (global or not). (except for d))
- (iv) Represent the phase portrait (using the expression of the first integral). (except for d)) \diamond
 - 2. We consider the nonlinear planar system

$$\dot{x} = x(1-x), \ \dot{y} = y(3-y).$$

Study the stability of its equilibrium points.