

1. Consider the system of equations

$$\begin{aligned}x'(t) &= x, \\y'(t) &= 4 + x - y^2.\end{aligned}$$

(a) Find all critical points of this system.

(b) Choose *one* of the critical points found in (a). Linearize the above system near this point, that is, find a *linear* system that is a good approximation to the true system near this point.

(c) Find the type and stability of the critical point studied in (b).

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$$\begin{aligned}x'(t) &= x, \\y'(t) &= 9 + x - y^2.\end{aligned}$$

(a) Find all critical points of this system.

(b) Choose *one* of the critical points found in (a). Linearize the above system near this point, that is, find a *linear* system that is a good approximation to the true system near this point.

(c) Find the type and stability of the critical point studied in (b).

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(b) Choose *one* of the critical points found in (a). Linearize the above system near this point, that is, find a *linear* system that is a good approximation to the true system near this point.

(c) Find the type and stability of the critical point studied in (b).