Quiz 1 MTH416.616

Tuesday, January 28, 2025 2:42 PM

$x' = \overbrace{x^2 + 2x + a = 0}^{\text{set}}$

$$x = \frac{-2 \pm \sqrt{4 - 4a}}{2} = -1 \pm \sqrt{1-a}$$

3 possibilities exist:

① $1-a<0$
↳ no equilibria because they would be complex

② $1-a=0 \leftrightarrow a=1$
↳ one equilibrium: $x=1$ ⇝ $+1$

③ $1-a>0 \leftrightarrow a<1$
↳ two equilibria: $x = -1+\sqrt{1-a}, -1-\sqrt{1-a}$

$+ -1+\sqrt{1-a}$

$+ -1-\sqrt{1-a}$

$a=1$ is a bifurcation point