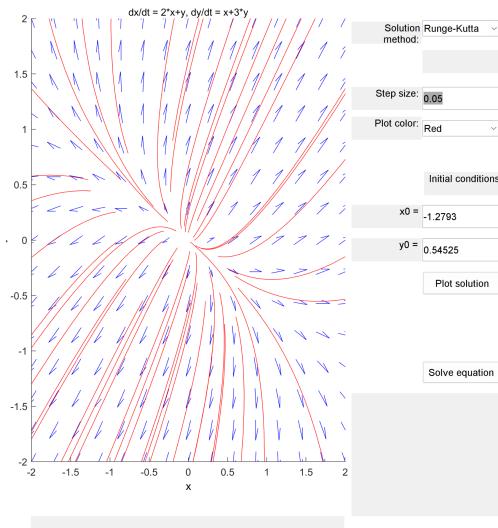


4.1. $\frac{dx}{dt} = [2 \ 1; 1 \ 3] x$

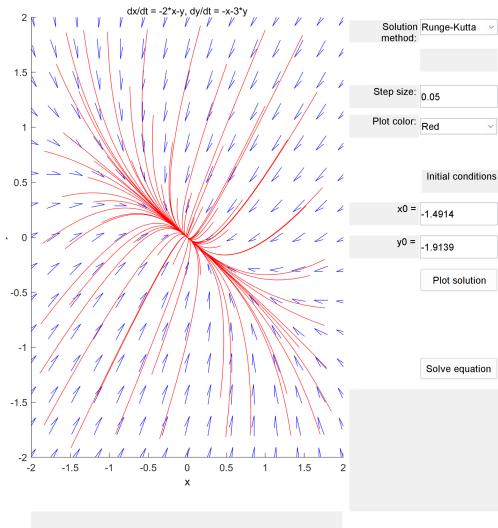


Source: Unstable node

Eigenvalue: 1.382 , 3.618

Matrix A is not diagonal and $\lambda > 0$, this justifies that this is an unstable improper node

4.2. $\frac{dx}{dt} = [-2 \ -1; -1 \ -3] x$

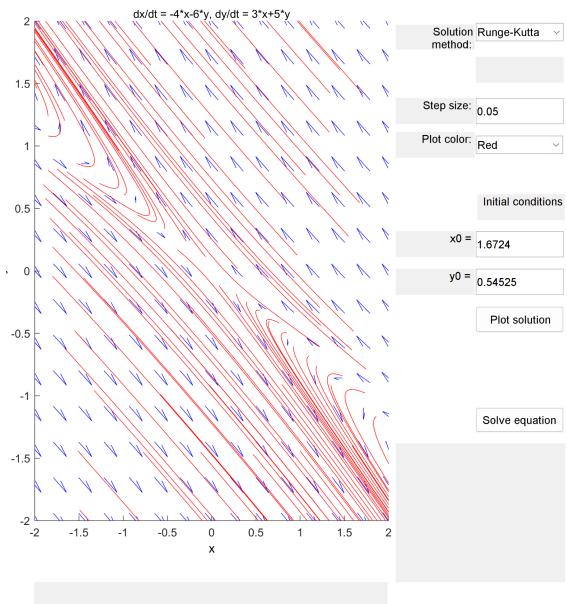


Source: Asymptotic stable node

-3.618, -1.382

Matrix A is not diagonal, $\lambda < 0$, this justifies that this is asymptotically stable

4.3. $\frac{dx}{dt} = [-4 -6; 3 5] x$

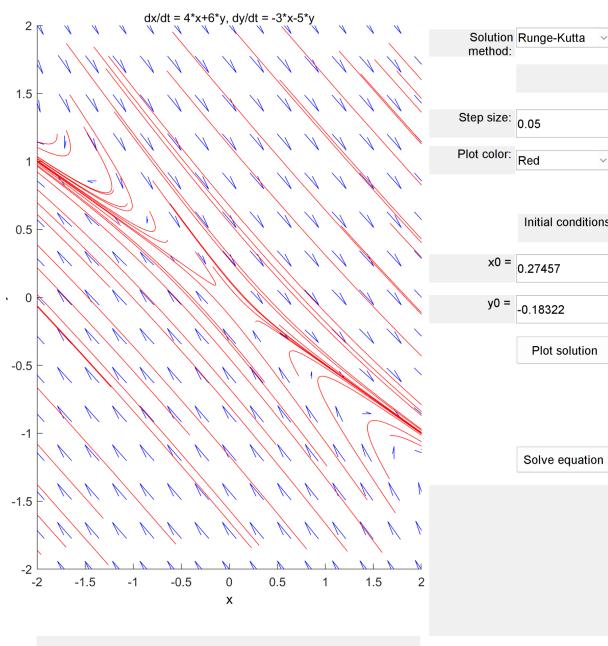


Unstable, saddle point

-1, 2

Matrix A is not diagonal, $\lambda > 0$, this justifies that this is an unstable improper node

4.4. $\frac{dx}{dt} = [4 6; -3 -5] x$

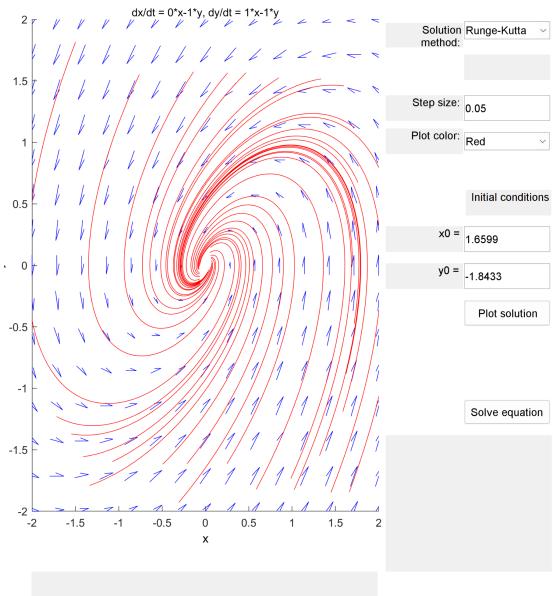


Unstable, saddle point

1, -2

Matrix A is not diagonal, $\lambda > 0$, this justifies that this is an unstable improper node

4.5. $\frac{dx}{dt} = [0 \ -1; 1 \ -1] x$

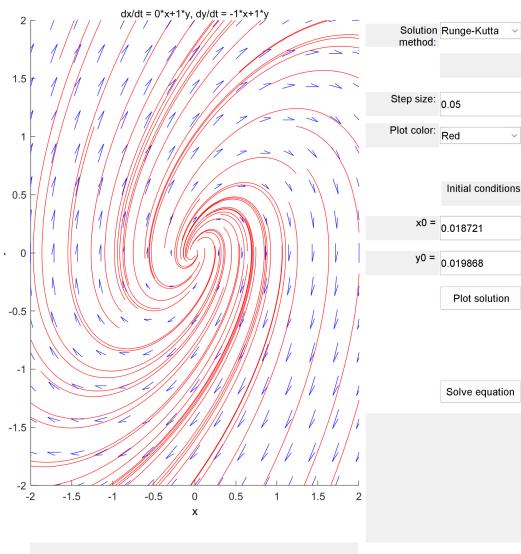


Asymptotic stable, spiral point

$$-0.5 + 0.8660i, -0.5 - 0.866i$$

Matrix A is not diagonalizable, $\lambda < 0$, this justifies that this is an asymptotically stable

4.6. $\frac{dx}{dt} = [0 \ 1; -1 \ 1] x$

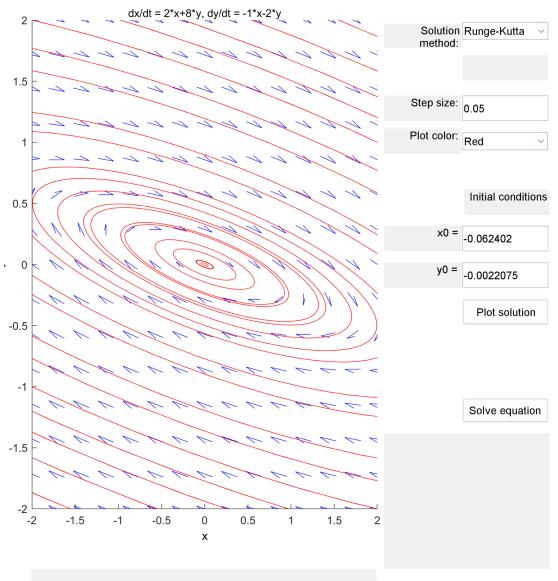


Asymptotically stable, spiral point

$$0.5 + 0.866i, 0.5 - 0.866i$$

Matrix A is not diagonal, $\lambda < 0$, this justifies that this is an asymptotically stable

4.7. $\frac{dx}{dt} = [2 \ 8; -1 \ -2] x$

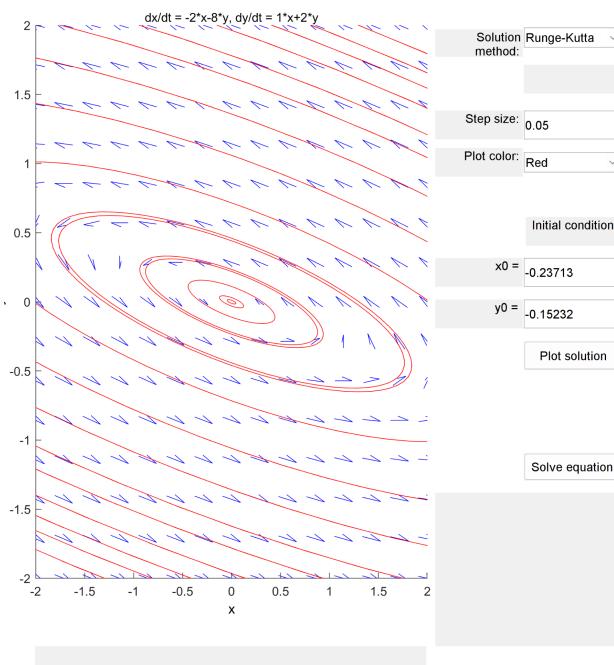


Unstable spiral point, clockwise

$$0 + 2i, 0 - 2i$$

A is not diagonal, eigenvalue is not repeated, this justifies that this is stable

4.8. $\frac{dx}{dt} = [-2 \ -8; 1 \ 2] x$

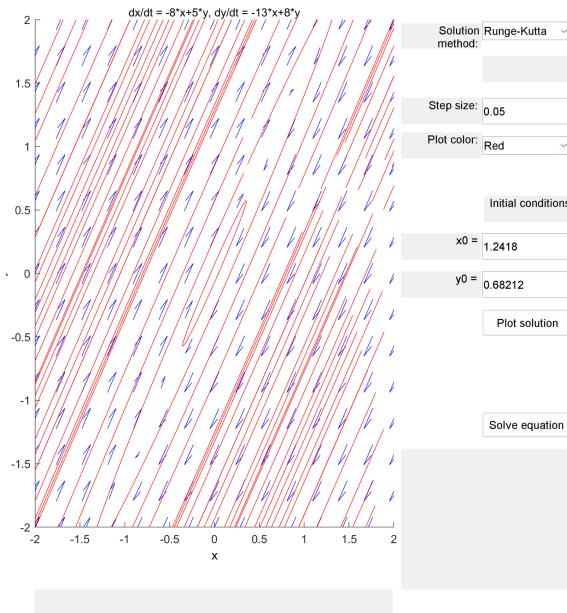


Stable center, counterclockwise

$$0 + 2i, 0 - 2i$$

A is not diagonal, eigenvalue is not repeated, this justifies that this is stable

4.9. $\frac{dx}{dt} = [-8 \ 5; -13 \ 8] x$

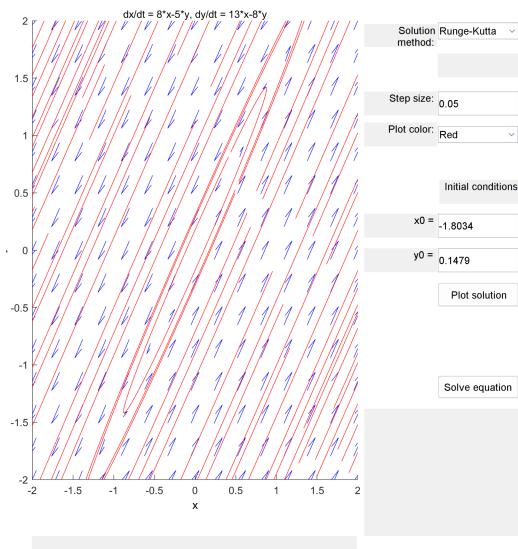


Stable center, clockwise

$$0 + i, 0 - i$$

A is not diagonal, but $\lambda < 0$, this justifies that this is stable

4.10. $\frac{dx}{dt} = [8 \ -5; 13 \ -8] x$



Stable center, counterclockwise

$$0 + i, 0 - i$$

A is not diagonal, but $\lambda < 0$, this justifies that this is stable