ⓘ Info

This note, that was found here, as a part of a collection
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Fixed points

Definition. Fixed point

For a flow on $\mathbb{R}^n$ $\dot{\mathbf{x}} = \mathbf{f}(\mathbf{x})$, $\mathbf{x}$ is a **fixed point** if $\mathbf{f}(\mathbf{x}) = \mathbf{0}$.

[1]

	sign of real part of eigenvalues		**stability**
	all 0		
hyperbolic	all > 0	source	unstable
hyperbolic	all < 0	sink	asymptotically stable
hyperbolic	mixed but $\neq 0$	saddle	unstable
	mixed with 0		

for $n = 2$

	sign of real part of eigenvalues		**stability**	**complex parts are all 0, so** $\lambda_1, \lambda_2 \in \mathbb{R}$	**complex parts are $\neq 0$, so** $\lambda \pm \mu$	
	both 0				stable **center**	
hyperbolic	both > 0	source	unstable		unstable **spiral**	
hyperbolic	both < 0	sink	asymptotically stable		stable **spiral**	
hyperbolic	mixed but $\neq 0$	saddle	unstable		(not possible)	
	mixed with 0				(not possible)	

Current note has 0 direct children and 0 total descendants.

- stem
  - subobjects of and functions on $\mathbb{R}^n, S^n, \mathbb{C}^n$ and its quotients $_\Gamma\backslash^{\mathbb{R}^n}, _\Gamma\backslash^{\mathbb{C}^n}$
    - ODEs in $\mathbb{R}^n$ $\leftrightarrow$ Vector fields in $\mathbb{R}^n$
      - Fixed points

And it has 10 siblings.

- stem
  - subobjects of and functions on $\mathbb{R}^n, S^n, \mathbb{C}^n$ and its quotients $_\Gamma\backslash^{\mathbb{R}^n}, _\Gamma\backslash^{\mathbb{C}^n}$
    - ODEs in $\mathbb{R}^n$ $\leftrightarrow$ Vector fields in $\mathbb{R}^n$
      - Constant of a flow in $\mathbb{R}^n$
      - Euler's iterative solution method for first order ODEs
      - Existence of integral curves of vector fields in $\mathbb{R}^n$
      - Fixed points
      - Flow of a vector field in $\mathbb{R}^n$
      - Graph $\to$ polynomial ODE
      - Gradient flows on $\mathbb{R}^n$
      - Hamiltonian vector fields in $\mathbb{R}^{2n}$ with standard symplectic form
      - Probability distribution of flow
      - Volume change by flows on $\mathbb{R}^n$

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1. VBalki.Non-Linear Dynamics.L02 > Critical points of a dynamical system ↩