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attractor

Canonical name	Attractor
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Entry type	Definition
Classification	msc 34C99
Defines	attracting set
Defines	repelling set
Defines	repellor

Let
$$\dot{x} = f(x)$$
be a system of autonomous ordinary differential equation in $\mathbb{R}^n$ defined by a vector field $f \colon \mathbb{R}^n \to \mathbb{R}^n$. A set A is said to be an *attracting set*[**?**, **?**] if

1. A is closed and invariant,

2. there exists an open neighborhood U of A such that all solution with initial solution in U will eventually enter A ($x(t) \to A$) as $t \to \infty$.

Additionally, if A contains a dense orbit then A is said to be an *attractor*[**?**, **?**]. Conversely, a set R is said to be a *repelling set*[**?**] if R satisfy the condition 1. and 2. where $t \to \infty$ is replaced by $t \to -\infty$. Similarly, if R contains a dense orbit then R is said to be a *repellor*[**?**].

References

[GH] GUCKENHEIMER, JOHN & HOLMES, PHILIP, *Nonlinear Oscillations, Dynamical Systems, and Bifurcations of Vector Fields*, Springer, New York, 1983.

[P] PERKO, LAWRENCE, *Differential Equations and Dynamical Systems*, Springer, New York, 2001.