

First Integral

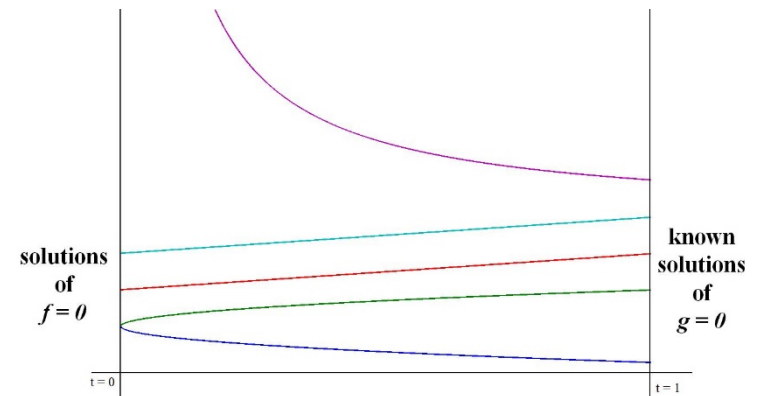
Every homotopy path we track arises from a differential equation with a system of first integrals – important for error correction.

▶ Homotopy $H(x, t) : \mathbb{C}^N \times \mathbb{C} \rightarrow \mathbb{C}^N$ with start point $x(1) = x^*$.

▶ Davidenko differential equation:

$$\dot{x} = -J_x H(x, t)^{-1} J_t H(x, t)$$

$$x(1) = x^*$$



First Integral

▶ $H(x(t), t) \equiv H(x^*, 1) = 0$ with $\frac{d}{dt} H(x(t), t) \equiv 0$.

