$$\frac{\partial u}{\partial t} + (u \cdot \nabla)u = F(t, x)$$

where u is a function $[0, T] \times \mathbb{R}^n \to \mathbb{R}^n$ and F a function $[0, T] \times \mathbb{R}^n \to \mathbb{R}^n$. The expression $u \cdot \nabla u$ reads in coordinates:

$$\sum_i u_i \frac{\partial u_j}{\partial x_i}$$