

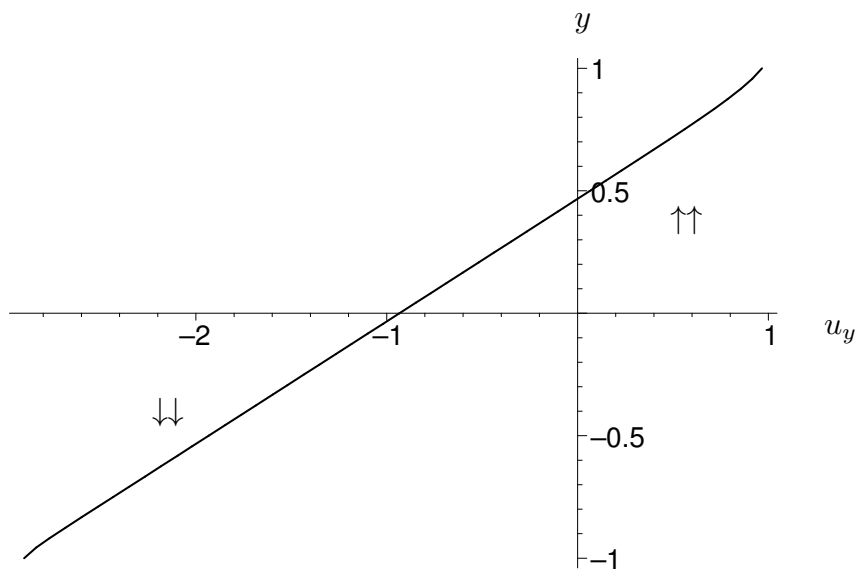
Higher-Order Problem

Consider the following equation:

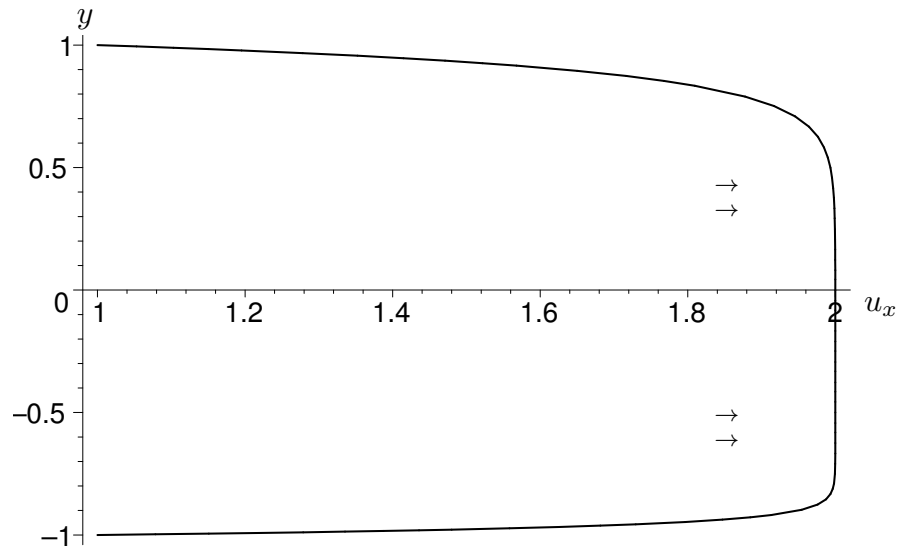
$$(v')^2 - vv'' + \text{Re}^{-1}v^{(3)} = k^2, \quad -1 \leq y \leq 1. \quad (1)$$

The solution to (1) describes a two-dimensional flow field $\mathbf{u} = (u_x, u_y) = (-xv', v)$. The boundary conditions are as follows:

$$v(-1) = -\alpha, \quad v(1) = 1, \quad v'(-1) = v'(1) = 0.$$



Asymptotic solution for vertical velocity with $\text{Re} = 10$, $\alpha = 3$.



Asymptotic solution for horizontal velocity with $\text{Re} = 10$, $\alpha = 3$, $x = -1$.