BVP problems

1. Solve the Blasius problem

$$f'''(\eta) + f(\eta)\, f''(\eta) = 0$$

$f(0) = 0$, $f'(0) = 0$, $f'(\eta_\infty) = 1$, where η_∞ is large (e.g. $\eta_\infty = 7$)

using the Shooting method.

2. Solve the problem

$$y''(x) - y(x) = e^x, \quad y(0) = 1/2, \quad y(1) = e$$

using the finite difference method. Compare the result with the exact solution

$$y(x) = \frac{1}{2} e^x (1 + x)$$

3.(Optional) Solve the problem

$$u'' - (u')^2 - u^2 + u + 1 = 0, \quad u(0) = 0.5, \quad u(\text{pi}) = -0.5$$

using the finite difference method.

4. Solve the Blasius problem using bvp4c.