

1D Steady-State Problems (Collocation method)

PDEs:

$$\begin{aligned} F_1(x, U_1, U_{1_x}, U_{1_{xx}}, \dots, U_N, U_{N_x}, U_{N_{xx}}) &= 0 \\ &= \\ &= \\ F_N(x, U_1, U_{1_x}, U_{1_{xx}}, \dots, U_N, U_{N_x}, U_{N_{xx}}) &= 0 \end{aligned}$$

Boundary conditions (at endpoints):

$$\begin{aligned} G_1(U_1, U_{1_x}, \dots, U_N, U_{N_x}) &= 0 \\ &= \\ &= \\ G_N(U_1, U_{1_x}, \dots, U_N, U_{N_x}) &= 0 \end{aligned}$$

(periodic and "no" boundary conditions are also permitted)