2D Steady-State Problems (Collocation method)

PDEs:

$$
\begin{aligned}
F_1(x, y, U1, U1_x, U1_y, U1_{xx}, U1_{yy}, U1_{xy}, U2, ...) &= 0 \\
. &= . \\
. &= . \\
F_N(x, y, U1, U1_x, U1_y, U1_{xx}, U1_{yy}, U1_{xy}, U2, ...) &= 0
\end{aligned}
$$

Boundary conditions:

$$
\begin{aligned}
G_1(x, y, U1, U1_x, U1_y, ..., UN, UN_x, UN_y) &= 0 \\
. &= . \\
. &= . \\
G_N(x, y, U1, U1_x, U1_y, ..., UN, UN_x, UN_y) &= 0
\end{aligned}
$$

(Periodic and "no" boundary conditions are also permitted.)