

**PDE**

$$\Delta \phi = f$$

**First-Order System**

$$\nabla \cdot \psi = f$$

$$\psi - \nabla \phi = 0$$

**Weak Form**

$$(\psi \cdot n, v)_{\partial\Omega} - (\psi, \nabla v)_{\Omega} = (f, v)_{\Omega}$$

$$(\psi, q)_{\Omega} + (\phi, q \cdot n)_{\partial\Omega} - (\phi, \nabla \cdot q)_{\Omega} = 0$$

**DPG Form**

$$(\hat{\psi}_n, v)_{\partial K} - (\psi, \nabla v)_K = (f, v)_K$$

$$(\psi, q)_K + (\hat{\phi}, q_n)_{\partial K} - (\phi, \nabla \cdot q)_K = 0$$

$$“b(u, v) = l(v)”$$