GDE

$$(\Delta + 2\,\Omega) * \frac{\partial^2 u}{\partial x^2} + \Omega\,\frac{\partial^2 u}{\partial y^2} + (\Delta + \Omega) * \frac{\partial^2 v}{\partial x\,\partial y} - \frac{(x + u) * \lambda}{\sqrt{(x + u)^2 + (r + v)^2}} = 0;$$

$$(\Delta + 2\,\Omega) * \frac{\partial^2 v}{\partial y^2} + \Omega\,\frac{\partial^2 v}{\partial x^2} + (\Delta + \Omega) * \frac{\partial^2 u}{\partial x\,\partial y} - \frac{(r + v) * \lambda}{\sqrt{(x + u)^2 + (r + v)^2}} = 0;$$

Flux Boundary Conditions

$$\Delta * \frac{\partial v}{\partial y} + (\Delta + 2\,\Omega) * \frac{\partial u}{\partial x} = 0;$$

$$\Omega * \left(\frac{\partial u}{\partial y} + \frac{\partial v}{\partial x}\right) = 0;$$

$$\Omega * \left(\frac{\partial^2 v}{\partial y^2} + \frac{\partial^2 v}{\partial x^2}\right) = 0;$$

$$\Delta * \frac{\partial v}{\partial y} + (\Delta + 2\,\Omega) * \frac{\partial u}{\partial x} = 0;$$

Inequality Boundary Condition

$$g = -r + \sqrt{(r + v)^2 + (u + x)^2} \geq 0$$

u and v are displacement field which are functions of x and y
r is a constant.
Ω and Δ are constants
λ is the lagrange multiplier used to impose the inequality constraint(g) while minimising the potential energy.