

# Modelado de flujo incompresible utilizando las ecuaciones de Navier-Stokes

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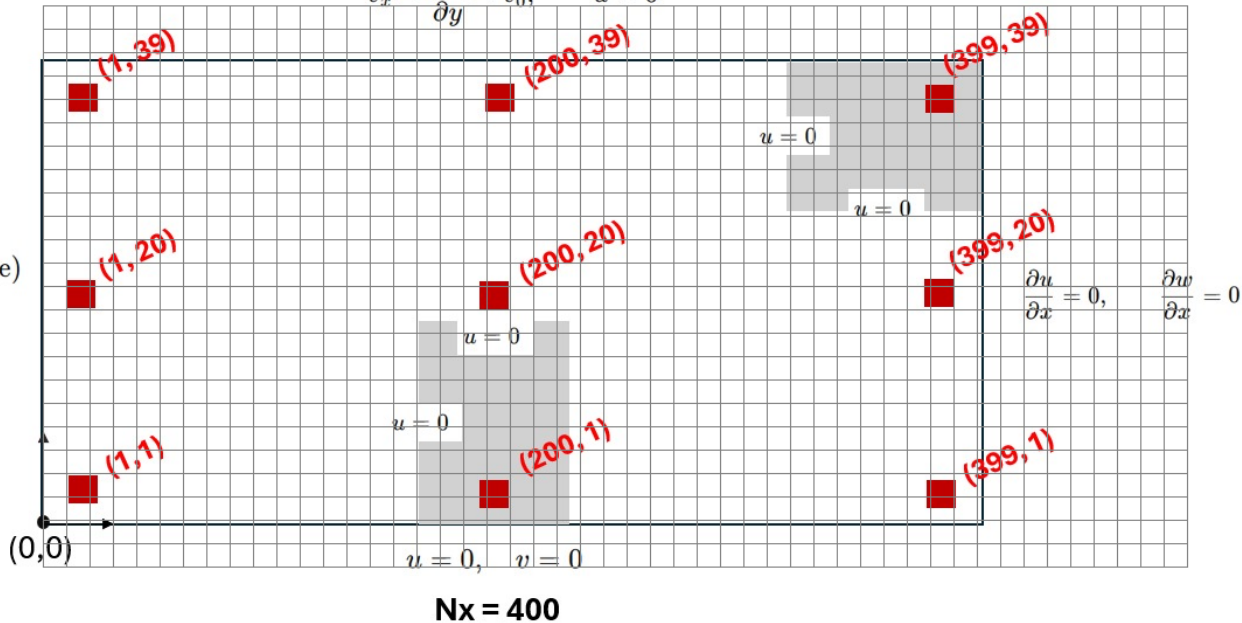
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Ny = 40

$$u = v_x = v_0 \quad (\text{cte})$$

$$v = v_y = 0$$

$$v_x = \frac{\partial u}{\partial y} = v_0, \quad u = 0$$



### Nodos izquierda (i=1)

#### • (1,1)

$$v_{1,1}^x = \frac{1}{4} \{ v_{2,1}^x + 1 + v_{1,2}^x + 0 \\ - \frac{1}{2} v_{1,1}^x (v_{2,1}^x - 1) \\ - \frac{1}{2} v_{1,1}^y (v_{1,2}^x - 0) \}$$

#### • (1,20)

$$v_{1,20}^x = \frac{1}{4} \{ v_{2,20}^x + 1 + v_{1,21}^x + v_{1,19}^x \\ - \frac{1}{2} v_{1,20}^x (v_{2,20}^x - 1) \\ - \frac{1}{2} v_{1,20}^y (v_{1,21}^x - v_{1,19}^x) \}$$

#### • (1,39)

$$v_{1,39}^x = \frac{1}{4} \{ v_{2,39}^x + 1 + V_0 + v_{1,38}^x \\ - \frac{1}{2} v_{1,39}^x (v_{2,39}^x - 1) \\ - \frac{1}{2} v_{1,39}^y (V_0 - v_{1,39}^x) \}$$

### Nodos centrales (i=200)

#### • (200,1)

$$v_{200,1}^x = \frac{1}{4} \{ v_{201,1}^x + v_{199,1}^x + v_{200,2}^x + 0 \\ - \frac{1}{2} v_{200,1}^x (v_{201,1}^x - v_{199,1}^x) \\ - \frac{1}{2} v_{200,1}^y (v_{200,2}^x - 0) \}$$

#### • (200,20)

$$v_{200,20}^x = \frac{1}{4} \{ v_{201,20}^x + v_{199,20}^x + v_{200,21}^x + v_{200,19}^x \\ - \frac{1}{2} v_{200,20}^y (v_{201,20}^x - v_{199,20}^x) \\ - \frac{1}{2} v_{200,20}^y (v_{200,21}^x - v_{200,19}^x) \}$$

#### • (200,39)

$$v_{200,39}^x = \frac{1}{4} \{ v_{201,39}^x + v_{199,39}^x + V_0 + v_{200,39}^x \\ - \frac{1}{2} v_{200,39}^x (v_{201,39}^x - v_{199,39}^x) \\ - \frac{1}{2} v_{200,39}^y (V_0 - v_{200,39}^x) \}$$

### Nodos derecha (i=399)

#### • (399,1)

$$v_{399,1}^x = \frac{1}{4} \{ 0 + v_{398,1}^x + v_{399,2}^x + 0 \\ - \frac{1}{2} v_{399,1}^x (0 - v_{398,1}^x) \\ - \frac{1}{2} v_{399,1}^y (v_{399,2}^x - 0) \}$$

#### • (399,20)

$$v_{399,20}^x = \frac{1}{4} \{ 0 + v_{398,20}^x + v_{399,21}^x + v_{399,19}^x \\ - \frac{1}{2} v_{399,20}^x (0 - v_{398,20}^x) \\ - \frac{1}{2} v_{399,20}^y (v_{399,21}^x - v_{399,19}^x) \}$$

#### • (399,39)

$$v_{399,39}^x = \frac{1}{4} \{ 0 + v_{398,39}^x + \mathbf{V}_0 + v_{399,38}^x \\ - \frac{1}{2} v_{399,39}^x (0 - v_{398,39}^x) \\ - \frac{1}{2} v_{399,39}^y (\mathbf{V}_0 - v_{399,38}^x) \}$$