Injection Molding Simulation

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- Hele-Shaw flow

$$u = u_s\left(1 - \frac{z^2}{h^2}\right)$$

fluidity:

$$S = \int_0^h \frac{z^2}{\eta}\, dz$$

- pressure

$$\frac{\partial}{\partial x}\left(S\frac{\partial p}{\partial x}\right) + \frac{\partial}{\partial y}\left(S\frac{\partial p}{\partial y}\right) = 0$$

- temperature

$$\rho c\left(\frac{\partial T}{\partial t} + u\frac{\partial T}{\partial x} + v\frac{\partial T}{\partial y}\right) = \eta\dot{\gamma}^2 + k\frac{\partial^2 T}{\partial z^2}$$

Injection Molding

- Plunger type

- Screw type

- Two-plate mold

Resin Transfer Molding

$$\nabla(\rho u) = 0$$

$$u = -\frac{1}{\mu} K \nabla p$$

$$\rightarrow \nabla(K \nabla p) = 0$$

- Boundary element formulation

- Experiment

ref: Um & Lee, Polym. Engr. Sci., 31, 765 (June 91).