

$$f_l = n \left[(v_0 + v_1 \epsilon) \frac{\partial v_\phi}{\partial x} + \pi_r \right]$$

$$\text{Since } \frac{\partial v_\phi}{\partial x} \neq 0,$$

$$p_l + q_l * f_l = 0$$

$$p_l + q_l * n \left[(v_0 + v_1 \epsilon) \frac{\partial v_\phi}{\partial x} + \pi_r \right] = 0$$