

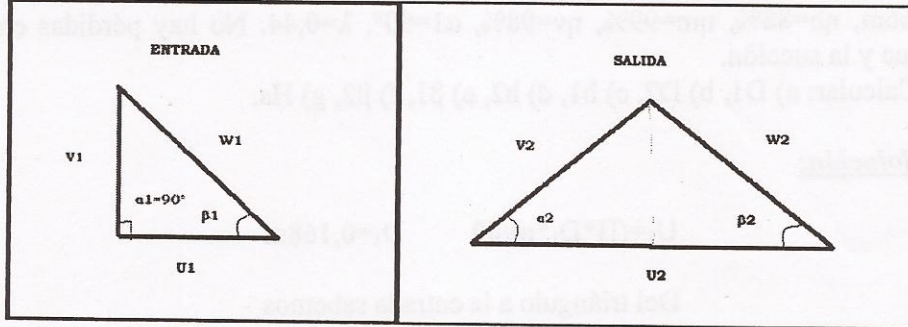


**PROBLEMA 3:**

Dados los siguientes datos calcular  $H_{th}$  y  $P_m$ .

$D_1$ : 120mm,  $D_2$ : 250mm,  $n$ : 1750rpm,  $b_1$ : 30mm,  $b_2$ : 12mm,  $\beta_2$ : 30°,  $\beta_1$ : 15°,  $\alpha_1$ : 90°,  $\delta_2$ : 0.9,  $\eta_H$ : 88%,  $\eta_m$ : 99%,  $\eta_v$ : 91%.

**Solución:**



$$P_m = (\gamma * Q * H) / \eta_m \dots\dots\dots(1)$$

$$U_2 = (\pi * D_2 * n) / 60 \quad U_2 = (\pi * 0,25 * 1750) / 60 \quad U_2 = 22,91 \text{ m/s}$$

$$U_1 = (\pi * D_1 * n) / 60 \quad U_1 = (\pi * 0,12 * 1750) / 60 \quad U_1 = 11 \text{ m/s}$$

$$Q = V_{m1} * A_1 = (U_1 * \text{tg}(\beta_1)) * \pi * D_1 * b_1 \quad Q = (11 * \text{tg}(15^\circ)) * \pi * 0,12 * 0,03$$

$$Q = 0,033 \text{ m}^3/\text{s}$$

$$V_{m2} = Q / (\pi * D_2 * b_2 * \delta_2) \quad V_{m2} = 0,033 / (\pi * 0,25 * 0,012 * 0,9) \quad V_{m2} = 3,89 \text{ m/s}$$

$$H_{th} = ((U_2 * V_{u2}) - (U_1 * V_{u1})) / g \quad \text{Nótese que } V_{u1} = 0 \text{ porque } \alpha_1 = 90^\circ$$

$$H_{th} = ((U_2 * (U_2 - V_{m2} * \text{ctg}(\beta_2))) / g \quad H_{th} = ((22,91 * (22,91 - 3,89 * \text{ctg}(30^\circ))) / 9,81$$

$$H_{th} = 37,77 \text{ m}$$

$$P_m = (\gamma * Q * H) / \eta_m \quad P_m = 12,3 \text{ KW}$$