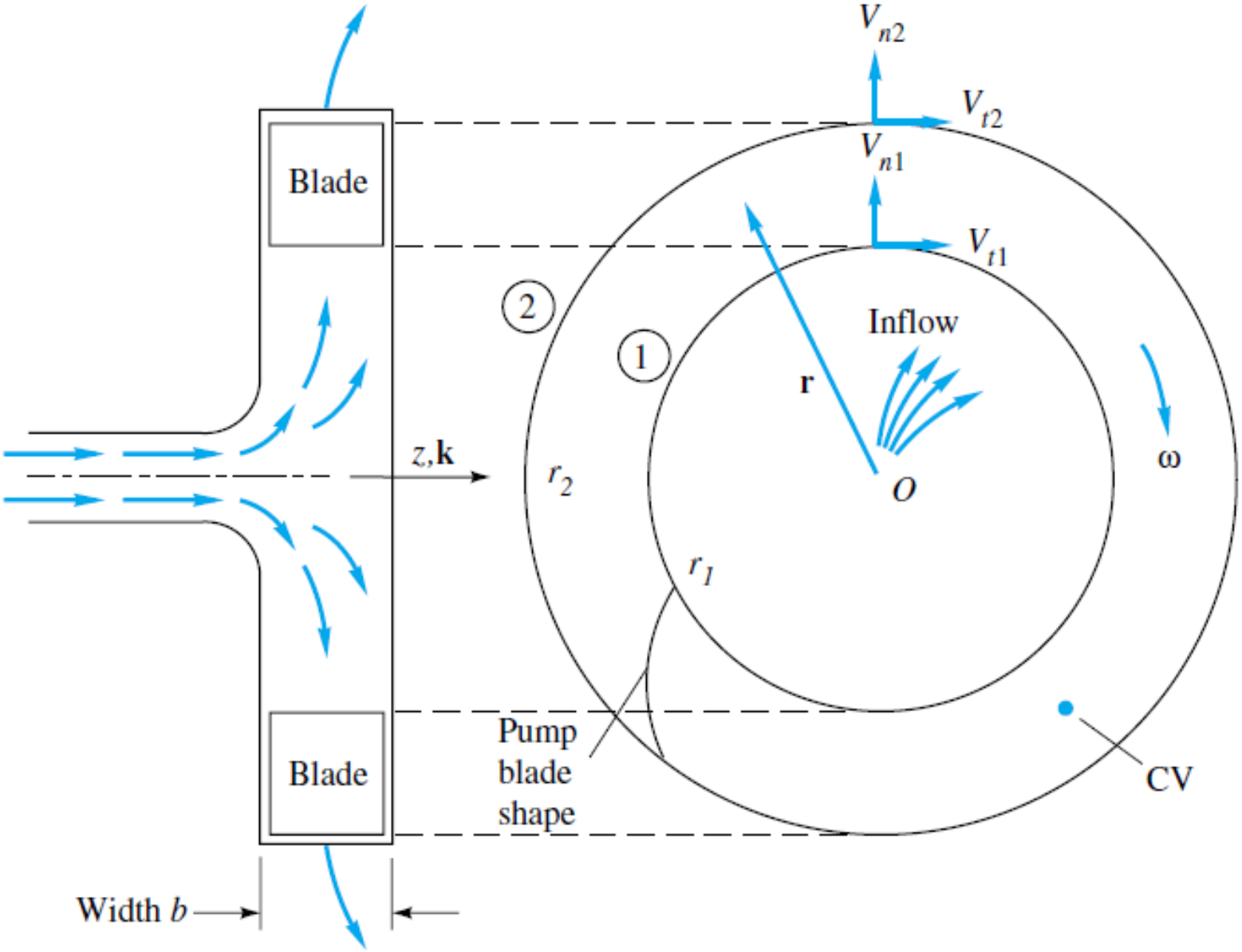
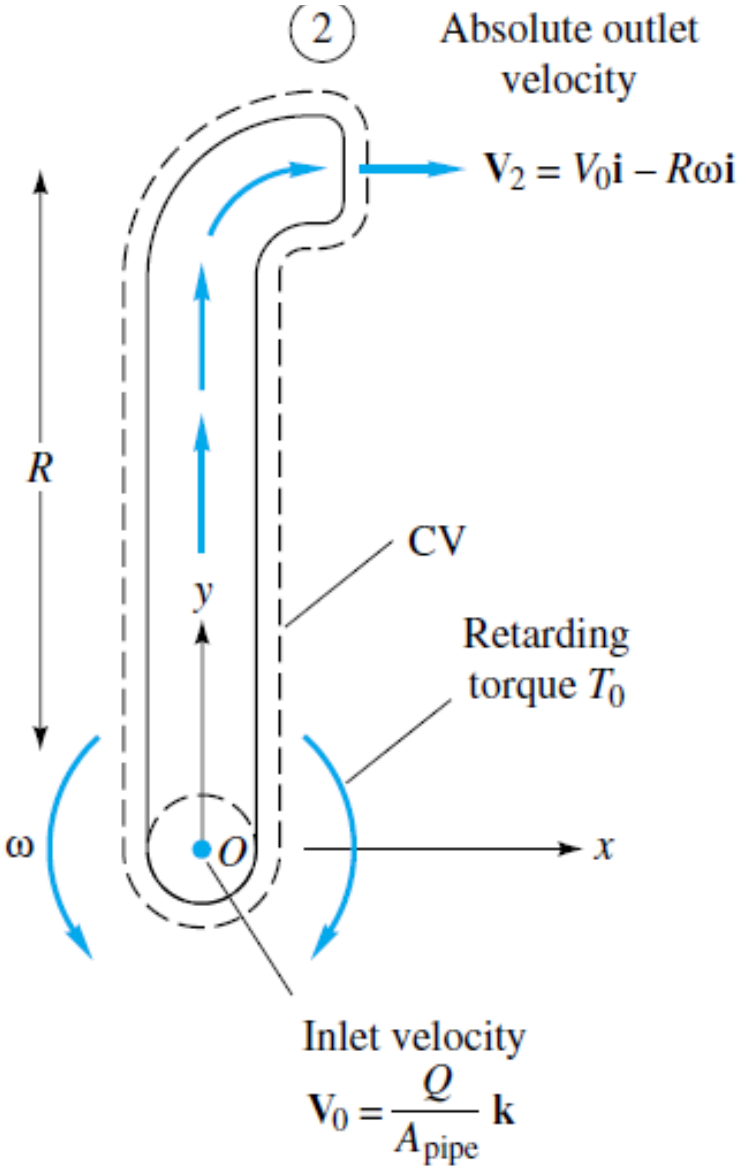
Exercícios VC

Parte 4



$$T_O = \rho Q \omega (r_2^2 - r_1^2)$$

Figure 3.14 shows a lawn-sprinkler arm viewed from above. The arm rotates about O at constant angular velocity ω. The volume flux entering the arm at O is Q, and the fluid is incompressible. There is a retarding torque at O, due to bearing friction, of amount $-T_O\mathbf{k}$. Find an expression for the rotation ω in terms of the arm and flow properties.



Modify Example 3.14 so that the arm starts from rest and spins up to its final rotation speed. The moment of inertia of the arm about O is I_0. Neglecting air drag, find $d\omega/dt$ and integrate to determine the angular velocity $\omega(t)$, assuming $\omega = 0$ at $t = 0$.