

4.29

4.29 The velocity of the water in the pipe shown in Fig. P4.29 is given by $V_1 = 0.50t$ m/s and $V_2 = 1.0t$ m/s, where t is in seconds. Determine the local acceleration at points (1) and (2). Is the average convective acceleration between these two points negative, zero, or positive? Explain.

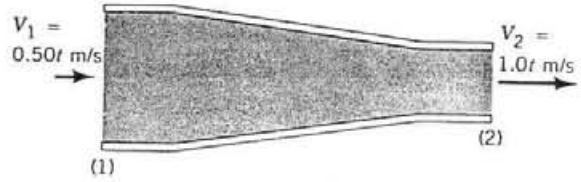


FIGURE P4.29

$$\frac{\partial V_1}{\partial t} = \underline{\underline{0.5 \frac{m}{s^2}}}$$

$$\frac{\partial V_2}{\partial t} = \underline{\underline{1.0 \frac{m}{s^2}}}$$

Since $V_2 > V_1$, it follows that $\frac{\partial V}{\partial x} > 0$. Also, $V > 0$ so that the convective acceleration, $V \frac{\partial V}{\partial x}$, is positive.