3 \hspace{1em} \textbf{Mass Conservation in Flowing Media}

3.1 Law of mass conservation for a continuum expressed in control volume form. Examples.

3.2 Mass conservation law in differential form. The physical significance of the divergence of the velocity: \( \nabla \cdot \vec{V} \) = the rate of increase of the material’s volume, per unit volume.

3.3 Some special forms of the mass conservation equation for quasi-one-dimensional flow, accounting for the effects of unsteadiness, compressibility, and cross-sectional area variations. Examples.

\textbf{Read:} \hspace{1em} Fay, Chapt. 3

\textbf{Problems:} \hspace{1em} Shapiro & Sonin \hspace{1em} 3.3, 3.5, 3.7, 3.8