Fluid Dynamics

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CHAPTER 1

SUMMARY OF EQUATIONS

1.1 Describing Fluid Flow: The convective derivative

In our treatment of Fluid Dynamics we rely upon the continuum hypothesis, providing the assumption that the fluid's thermodynamic properties are well defined. In doing so we can describe a fluid by specifying its velocity $\vec{\mathbf{u}}(\vec{\mathbf{x}}, t)$ at any point in the domain of the fluid flow, along with pressure, $p(\vec{\mathbf{x}}, t)$, its density $\rho(\vec{\mathbf{x}}, t)$ and other variables of relevance.

Within such a discussion, there are two possible methods of describing our fluid flow scenarios; Eulerian and Lagrangian descriptions.

The Eulerian description aims at looking