Chapter 17

Vector Analysis

17.1 Introduction: Vector Fields

12/29:

- In this chapter, we will consider vector functions of several variables, such as the function giving the velocity $\mathbf{v} = \mathbf{F}(x, y, z, t)$ of a particle in a fluid located at position (x, y, z) at time t.
- **Steady-state flow**: A flow for which the velocity function does not depend on the time t.
- **Vector field**: The collection of all vectors $\mathbf{F}(P)$ assigned to each point P in a region G.
- **Gradient field**: The vector field defined for points in the domain G of a scalar function T such that $\mathbf{F}(P) = \nabla T(P)$.