

Classification of Physical Quantities

Physical quantities are classified based on their nature and how they can be measured. This classification helps in understanding, measuring, and expressing various physical phenomena. The primary categories are:

1. Fundamental (Base) Quantities:

- **Description:** Fundamental quantities are the basic physical quantities that are defined independently and cannot be described in terms of other quantities. They form the foundation of physical measurements.
- **Examples:** Length (meter), mass (kilogram), time (second), electric current (ampere), temperature (Kelvin), amount of substance (mole), luminous intensity (candela).

2. Derived Quantities:

- **Description:** Derived quantities are those that are formed by combining fundamental quantities through mathematical relationships. They are dependent on the fundamental quantities.
- **Examples:** Velocity (meters per second), acceleration (meters per second squared), force (Newton), energy (joule), power (watt), pressure (Pascal).

3. Scalar Quantities:

- **Description:** Scalar quantities are defined by only their magnitude and do not have a direction. They are fully described by a numerical value and a unit.
- **Examples:** Temperature, mass, time, distance, speed.

4. Vector Quantities:

- **Description:** Vector quantities are defined by both their magnitude and direction. They require both a numerical value and a direction to be fully described.
- **Examples:** Displacement, velocity, acceleration, force, momentum.

These classifications help in the systematic study and application of physical principles, ensuring that measurements and calculations are precise and meaningful.