

Physical Systems to Mathematics

The objective of mathematical modeling is the development of sets of quantitative (mathematical) expressions that capture the essential aspects of an existing system. A mathematical model can assist in understanding the complex physical interactions in the system and the causes and effects between the system variables. The state equation forming the mathematical model defines a relationship between the state variables (dependent variables) and the independent variables, i.e., time and spatial variables of the system. These equations are derived, from applying the conservation law for a specific fundamental quantity say S , on a specific system with defined boundaries.

The quantity S can be any one of the following quantities:

- Total Mass
- Component Mass (Mole)
- Total Energy
- Momentum