documentation_V3

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1 Overview of included attributes and methods

1.1 Vectors: Change throughout the process

State variables:

- `pressure`: pressure of the fluid
- `volume`: volume of the fluid
- `temperature`: temperature of the fluid
- `entropy`: entropy of the system
- `internal_energy`: internal energy of the system
- `heat`: represents the heat added by each process Q_{in}
- `work`: represents the work done on the fluid by each process W_{on}

Extensive variables:

- `rms`: root mean square velocity of the particles in the fluid
- `nv`: atomic density of the particles in the fluid
- `mean_free_path`: mean free path of the particles in the fluid
- `mean_collision_time`: mean collision time of the particles in the fluid
- `collision_rate`: collision rate of the particles in the fluid

Additional variables:

- `processes`: list of processes that the fluid has undergone

1.2 Scalars: Static throughout the process

- `M`: molar mass of the fluid
- `n`: number of moles of the fluid
- `Cv`: heat capacity at constant volume
- `Cp`: heat capacity at constant pressure
- `gamma`: ratio of heat capacities
- `diameter`: molecular diameter of the molecules in the fluid
- `atomic_mass`: mass of the atoms in the fluid
- `time_taken`: time taken for the processes to occur
- `heat_added`: total heat added to the fluid Q_{in}
- `heat_removed`: total heat removed from the fluid Q_{out}

Only for cycles:

- `T_hot`: temperature of the hot reservoir
- `T_cold`: temperature of the cold reservoir
- `compression_ratio`: ratio of the volume of the fluid at the end of the compression process to the volume of the fluid at the start of the compression process

1.3 Other

- `name`: name of the fluid
- `formula`: chemical formula of the fluid
- `title`: title of the cycle [only for cycles]
- `properties`: dictionary of properties of the fluid

1.4 Methods of the fluid class

the methods are named after the processes that the fluid undergoes, they take one final state variable and time taken as arguments and then calculate the state vectors throughout the process.

- `isothermal(P = pressure, V = volume, time = time taken)`: isothermal process
- `isobaric(T = temperature, V = volume, time = time taken)`: isobaric process
- `isochoric(T = temperature, P = pressure, time = time taken)`: isochoric process
- `adiabatic(P = pressure, V = volume, T = temperature, time = time taken)`: adiabatic process