Definition

If a function $f(x_1, \ldots, x_n)$ of n variables $x_1, \ldots, x_n$ is such that, for any constant λ

$$f(\lambda x_1, \ldots, \lambda x_n) = \lambda^m f(x_1, \ldots, x_n)$$

then $f(\lambda x_1, \ldots, \lambda x_n)$ is called homogeneous of degree m, with $m > 1$.

Euler's theorem on homogeneous functions. The partial derivative of homogeneous function obey the relation

$$\sum_{i=1}^{n} x_i \frac{\partial f}{\partial x_i} = mf$$

Thermodynamic

In context of thermodynamics, extensive properties are homogeneous functions of first order, while intensive properties are homogeneous functions of order zero.

Extensive properties. An extensive property scales linearly with the system's size. Properties such as U, V, m, n, and N are all examples of extensive properties; they will double their values upon doubling the size of the system. Another examples of extensive properties is entropy, stated by second Thermodynamics postulate.

Intensive properties. An intensive property does not depend on the size (or extent) of the system; it is a scale invariant. The ratio between two extensive properties is an intensive property. The molar mass M is therefore an intensive property.