



**Definition**

A *real linear transformation* is a function  $f : \mathbf{R}^n \rightarrow \mathbf{R}^m$  satisfying

$$f(\alpha x + \beta y) = \alpha f(x) + \beta f(y).$$

Equivalently,  $f$  is (a) homogenous  $f(\alpha x) = \alpha f(x)$  and (b) additive  $f(x + y) = f(x) + f(y)$ .



