

6.6 EIGEN FUNCTION AND EIGEN VALUE

A function f is called an eigen function of the operator \hat{A} if when the operator \hat{A} operates on the function f , we get the same function multiplied by a constant C i.e.

$$\hat{A}f = Cf$$

The constant C is called the **eigen value** of the operator \hat{A} .
Equation (i) is known as **eigen value equation**.

For example, if the operator $\hat{A} = \frac{d}{dx}$ and f is a function of x given by $f(x) = e^{mx}$, then

$$\hat{A}f(x) = \frac{d}{dx} e^{mx} = m e^{mx} = mf(x)$$

or

$$\hat{A}f = mf$$

Therefore $f = e^{mx}$ is an eigen function of the operator $\hat{A} = \frac{d}{dx}$ with eigen value = m

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