

## 0.1 Examples of linear operators on real functions

For a function  $v$  we can define operators  $Ov$ .

Here we consider some examples and their properties.

### 0.1.1 Real multiplication

$$Rv = rf(x)$$

This operator is hermitian. This is equivalent to a finite operator of the form  $rI$ .

### 0.1.2 Multiplication by underlying real number

$$Xv = xf(x)$$

This operator is hermitian. This is equivalent to a finite operator of the form  $M_{ii} = i$  and  $M_{ij} = 0$ .

### 0.1.3 Differentiation

$$Dv = \frac{\delta}{\delta x} f(x)$$

While this operator is not hermitian, the following is:

$$-iDv = \frac{\delta}{\delta x} [-if(x)]$$