Let V be a vector space over a field F and function

$I: V \rightarrow V$ be the identity transformation. Find range of I: R(I)

Solution

The range of operator $A: V \rightarrow V$ is a set of values it reaches

$$R(A) = \{v \in V | \exists w \in V : v = A(w)\}$$

The identity operator is defined as

$$I(v) = v, \forall v \in V$$

Thus the range of identity operator I is:

$$R(I) = \{v \in V | \exists w \in V : v = I(w)\} = \{v \in V | \exists w \in V : v = w\} = V$$

Answer: *V.*