

Eg:- Let  $\vec{u}, \vec{v} \in \mathbb{R}^n$

$\Rightarrow \vec{u} = n \times 1$   $\vec{u}, \vec{v} = n \times 1$  matrix

$\Rightarrow \vec{u}^T = 1 \times n$  matrix

$\Rightarrow$  Matrix product  $\vec{u}^T \vec{v} = 1 \times 1$  matrix which is a real no.

(This real no. is called The inner product or dot product, written  $\vec{u} \cdot \vec{v}$ .)

Eg:- Let us take the space  $\mathbb{R}_n[t]$

Let  $t_0, t_1, \dots, t_n$  be distinct real nos. ~~( $n+1$  vectors)~~  
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$$\langle p, q \rangle = p(t_0)q(t_0) + p(t_1)q(t_1) + \dots + p(t_n)q(t_n)$$

For the space  $C[a, b]$  of all continuous  $f^n$  on the closed interval  $[a, b]$  we make into an inner product:

$$\langle f, g \rangle = \int_a^b f(t)g(t) dt$$