Let $\mathbf{p} = [p_1, p_2]^T$ and $\mathbf{q} = [q_1, q_2]^T$ be two vectors in 2D.

$$\kappa(\cdot,\cdot)$$
 is a kernel and $\phi(\cdot)$ is the corresponding feature map.

Let $z = \kappa(\mathbf{p}, \mathbf{q}) = (\mathbf{p}^T \mathbf{q})^2$. (A) [Ans] z is scalar.

(B) [Ans]
$$z$$
 is unique for the given $\kappa()$.

- (C) ϕ () is unique given the κ ().
- (E) All the above.

(D) $\phi() \in R^2$.

Let $\mathbf{p} = [p_1, p_2]^T$ and $\mathbf{q} = [q_1, q_2]^T$ be two vectors in 2D.

$$\kappa(\cdot,\cdot)$$
 is a kernel and $\phi(\cdot)$ is the corresponding feature map.

Let
$$\kappa() = \sum_{i=1}^{P} \kappa_i()$$
. Then the $\phi()$ is

(A) $\sum_{i=1}^{P} \phi_i()$ (B) $\Pi_{i=1}^{P} \phi_{i}()$

(C) **[Ans]** ϕ () is obtained by concatenating ϕ_i ()s.

(D) There is no analytical relationship between
$$\phi()$$
 and $\phi_i()$ s.

- (E) None of the above.

 $\kappa(\cdot,\cdot)$ is a kernel and $\phi(\cdot)$ is the corresponding feature map.

Let $\mathbf{p} = [p_1, p_2]^T$ and $\mathbf{q} = [q_1, q_2]^T$ be two vectors in 2D.

If
$$\phi(\mathbf{z}) = [z_1^2, z_2^2, \sqrt{2}z_1z_2]^T$$
 then $\kappa(\mathbf{p}, \mathbf{q})$ is:

 $(A) p^T q$

(B) [Ans]
$$(p^{T}q)^{2}$$

(B) [Ans]
$$(\mathbf{p}^{T}\mathbf{q})^{2}$$

(C) $(\mathbf{p}^{T}\mathbf{q})^{\sqrt{2}}$

(D)
$$(1 + \mathbf{p}^T \mathbf{q})^2$$

(E) None of the above.

 $\kappa(\cdot,\cdot)$ is a kernel and $\phi(\cdot)$ is the corresponding feature map.

Let $\mathbf{p} = [p_1, p_2]^T$ and $\mathbf{q} = [q_1, q_2]^T$ be two vectors in 2D.

If
$$\phi(\mathbf{z}) = [z_1^2, z_2^2, z_1 z_2, z_2 z_1]^T$$
 then $\kappa(\mathbf{p}, \mathbf{q})$ is:

If
$$\phi(\mathbf{z}) = [z_1, z_2, z_1 z_2, z_2 z_1]$$
 then $\kappa(\mathbf{p}, \mathbf{q})$ is:
(A) $\mathbf{p}^T \mathbf{q}$

(C) $(\mathbf{p}^T\mathbf{q})^{\sqrt{2}}$

(b)
$$(\mathbf{p} \cdot \mathbf{q})^{T}$$

(D) $(1 + \mathbf{p}^{T}\mathbf{q})^{2}$

(B) [Ans] $(\mathbf{p}^T\mathbf{q})^2$

(E) None of the above.

 $\kappa(\cdot,\cdot)$ is a kernel and $\phi(\cdot)$ is the corresponding feature map.

Let $\mathbf{p} = [p_1, p_2]^T$ and $\mathbf{q} = [q_1, q_2]^T$ be two vectors in 2D.

(C) $(\mathbf{p}^T\mathbf{q})^{\sqrt{2}}$

(D) [Ans] $(1 + p^Tq)^2$ (E) None of the above.

If
$$\phi(\mathbf{z}) = [z_1^2, z_2^2, \sqrt{2}z_1z_2, \sqrt{2}z_1, \sqrt{2}z_2, 1]^T$$
 then $\kappa(\mathbf{p}, \mathbf{q})$ is:

(A)
$$\mathbf{p}^{\mathsf{T}}\mathbf{q}$$

A)
$$\mathbf{p}^T \mathbf{q}$$
B) $(\mathbf{p}^T \mathbf{q})^2$

(A)
$$\mathbf{p}^T \mathbf{q}$$

(B) $(\mathbf{p}^T \mathbf{q})^2$

$$T_{\mathbf{q}}$$