The Radial Kernel (RBF)

The **Radial Kernel**

$$K(a,b) = e^{-\gamma}(a-b)^2$$

projects to **infinite dimensional** space

works similar to nearest neighbors classifier

we can use the Polynomial Kernel to get the intuition
behind how Radial Kernel works in infinite dimensions

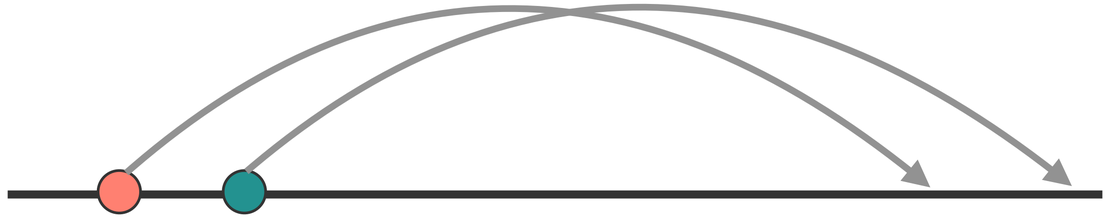
$$K(a,b) = (a \cdot b + r)^d$$

set $r = 0 \implies (a \cdot b)^d = a^d \cdot b^d$

set $d = 1 \implies (a) \cdot (b)$

set $d = 2 \implies (a^2) \cdot (b^2)$

set $d = 3 \implies (a^3) \cdot (b^3)$



we stay in same dimension
but what if we took these polynomials as a sum?

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$$K(a,b) = (a \cdot b)^d$$

$$ab + a^2b^2 = (a, a^2)(b, b^2)$$