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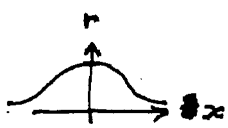
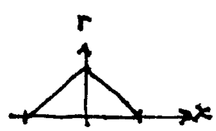
observation: Radial basis function networks compute functions with the following properties.

1) Continuity (no steps if basis func has no steps)
2) Differentiability (smooth if basis func smooth)
3) Asymptotic decay to zero as $\vec{x} \to \infty$ (provided individual basis functions decay to zero as $d \to \infty$).

observation: If the individual basis functions are nonzero for large values of distance, d, from the center point, then evaluation of the network output sum involves many or all of the radial basis function output values.



For example, if we use gaussian radial basis functions, then for any input $\vec{x}$ every $r_j(\vec{x})$ will be nonzero and will contribute to $f(\vec{x})$.



If we instead used cone-shaped radial basis functions, then we would know that $r(\vec{x})$ would be zero for $r_j(\vec{x})$'s with center points far from $\vec{x}$. Thus, our computations would be reduced.

observation: If the radial basis functions extend out far enough to reach another center point before going to zero, then we cannot say that the network output at a center point is equal to the weight w_j assigned to that center point's radial basis function.

If the radial basis functions do not overlap other center points, then the weights, w_j, each represent the value of $f(\vec{x})$ at a center point.