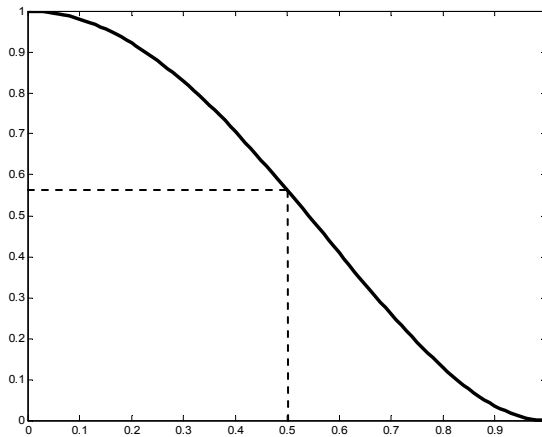


A CLASS OF POWER-DECAY FUNCTIONS

If d_{ij} denotes the distance from individual i to liquor store j , and if d denotes the maximum radius of influence (*bandwidth*) then the class of *power-decay functions* is defined for each positive integer k by

$$(1) \quad \tau_k(d_{ij} | d) = \begin{cases} \left[1 - (d_{ij}/d)^k\right]^k & , 0 \leq d_{ij} \leq d \\ 0 & , d_{ij} > d \end{cases}$$

where typical values of k are 2, 3 and 4. Note that $\tau_k(d_{ij} | d)$ falls continuously to zero as d_{ij} approaches d , and is defined to be zero beyond d . The graph below shows the case of a *quadratic-decay functions* ($k = 2$) as shown in the figure below for $d = 1$:



Hence stores located at distance $d/2$ from i are only weighted about half as much as stores very close to i . Notice also that for higher powers one obtains a larger “flat” region for small distances, as shown for $k = 4$ below, where the influence at $d/2$ has now increased to about three quarters.

