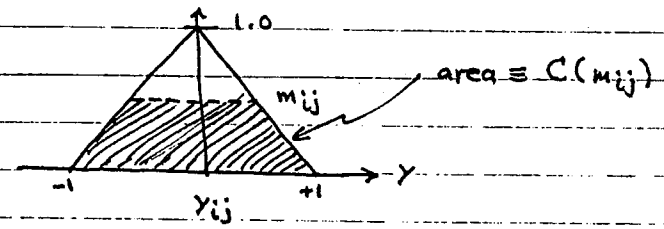
Neil E Cotter
1 ar 1994

tool: The area or mass for a triangular centroid is a quadratic function of the membership value m_{ij}.

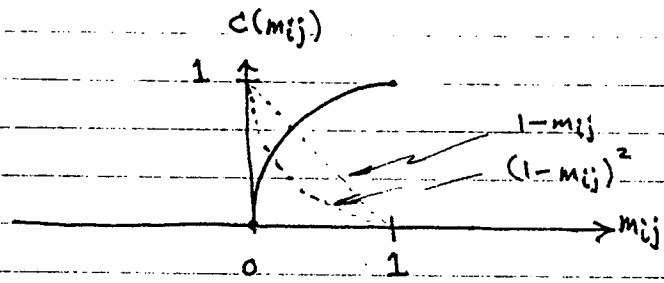
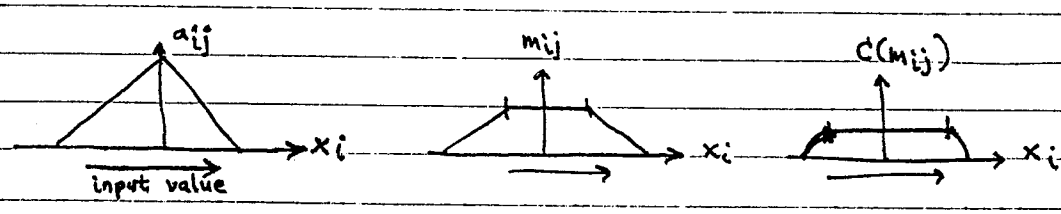


derivation: Area of entire triangle $= \frac{1}{2}$ base · height $= \frac{1}{2} \cdot 2 \cdot 1 = 1$

Area of triangle above line $= \frac{1}{2}\left[\text{base} = 2 \cdot (1 - m_{ij})\right]\left[\text{height} = 1 - m_{ij}\right]$

" " " " $= (1 - m_{ij})^2$

$\therefore$ Area of centroid $\equiv C(m_{ij}) = 1 - (1 - m_{ij})^2$
(= big Δ − little Δ)



tool: If the membership function is triangular, then as input value x_i passes under the peak of membership function a_{ij} we have m_{ij} increasing to a max value and then decreasing again. Then $C(m_{ij})$ increases to a max value and then decreases again.