F = 0.8, only the most recent 25 or so data points contribute to the final result, since all older data points are essentially weighted out of the solution.

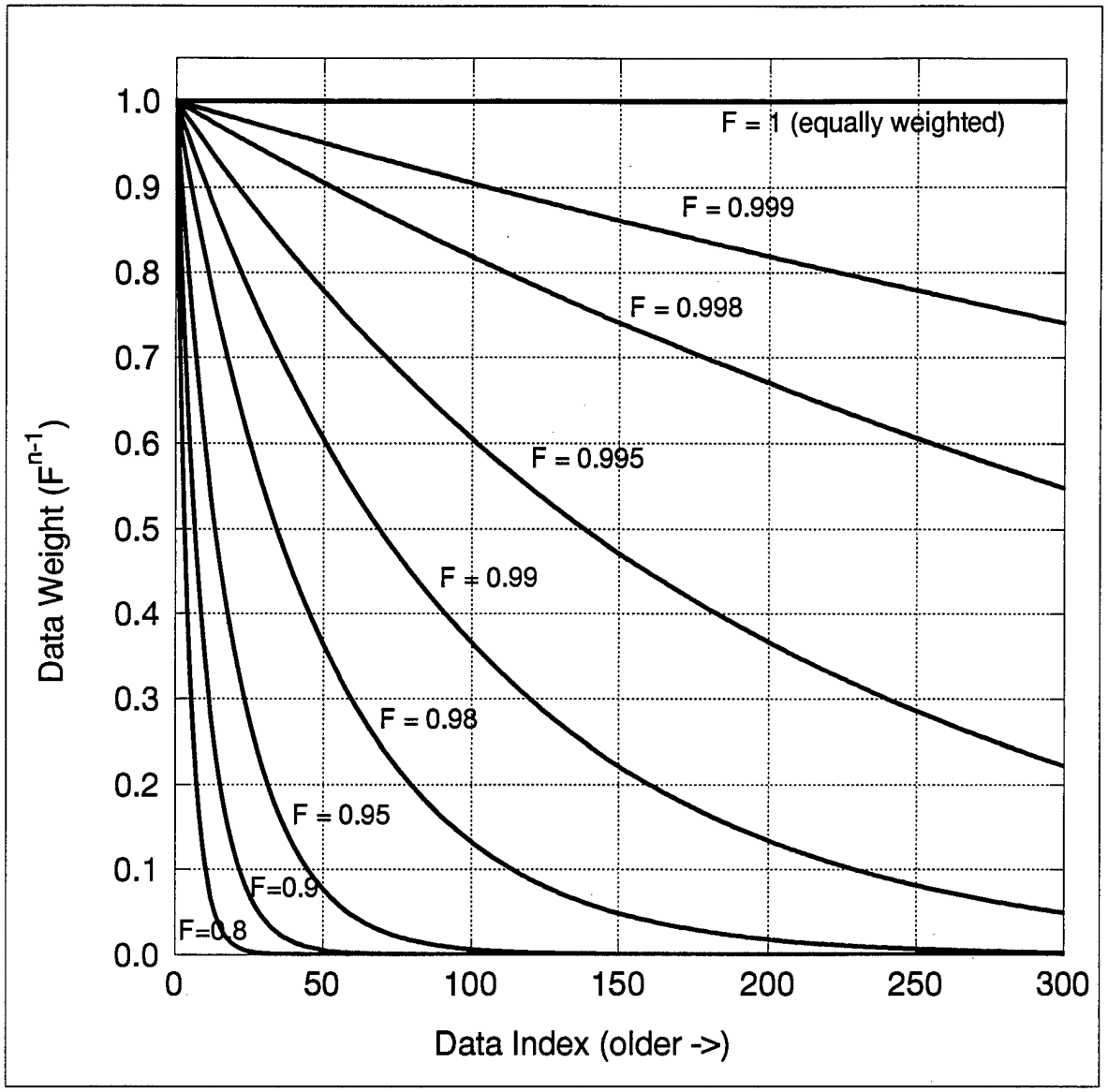

Figure 35. Exponential Weights for Fading-Memory Filters

For the exponentially-weighted fading-memory filter, it can be shown that the recursive filter factor used in Eq. (12) is

$$a_n = \frac{1-F}{1-F^n} \tag{20}$$

Since $0 \le F \le 1$, a_n in Eq. (20) does not approach zero as n approaches infinity (as the other two filters do), but instead approaches the value (1 – F). If F = 0, then $a_n = 1$ for all n, the filter has no memory at all, and the filtered value always equals the last measurement. In the limit as F approaches one, L'Hospital's rule can be applied to