Ranking Function for JM Smoothing

$$f(q,d) = \sum_{\substack{w_i \in d \\ w_i \in q}} c(w,q)[\log \frac{p_{Seen}(w_i \mid d)}{\alpha_d \, p(w_i \mid C)}] + n \log \alpha_d$$

$$p(w \mid d) = (1-\lambda)\frac{c(w,d)}{\mid d \mid} + \lambda \, p(w \mid C) \qquad \lambda \in [0,1]$$

$$\frac{p_{seen}(w \mid d)}{\alpha_d p(w \mid C)} = \frac{(1-\lambda)p_{ML}(w \mid d) + \lambda p(w \mid C)}{\lambda p(w \mid C)} = 1 + \frac{1-\lambda}{\lambda} \frac{c(w,d)}{\mid d \mid p(w \mid C)}$$

$$f_{JM}(q,d) = \sum_{\substack{w \in d \\ w \in q}} c(w,q) \log[1 + \frac{1-\lambda}{\lambda} \frac{c(w,d)}{\mid d \mid p(w \mid C)}]$$