$$\frac{\binom{m}{0}\binom{n-m}{K}}{\binom{n}{K}} = \frac{1\cdot(n-m)!\,(n-K)!\,K!}{(n-m-K)!\,K!\,n!} = \frac{(n-m)!\,(n-K)!}{(n-m-K)!\,n!}$$

ESERCIZIO 1

① $$\frac{(n-K)!}{(n-m-K)!} = \frac{(n-K)(n-K-1)(\dots)(n-K-m)!}{(n-m-K)!}$$

② $$\frac{(n-m)!}{n!} = \frac{(n-m)!}{n(n-1)(\dots)(n-m)!}$$

①② $$= \left[\frac{(n-K)}{n}\right]\left[\frac{(n-K-1)}{n-1}\right](\dots)\left[\frac{(n-K-m+1)}{(n-m+1)}\right]$$ [m fattori] / [m fattori]

i i m

$n-K-2 \approx n-K$ per 2 che arriva a $m+1$

$n-2 \approx n$ per 2 che arriva a $m+1$

$\Rightarrow$ INFATTI $K << m << n$

Quindi:

①② $\approx \underbrace{\left(\frac{n-K}{n}\right)\left(\frac{n-K}{n}\right)(\dots)\left(\frac{n-K}{n}\right)}_{m \text{ fattori}} \Longrightarrow \left(\frac{n-K}{n}\right)^m$

ESERCIZIO 2

② $$\left(1-\frac{K}{n}\right)^m = e^{-10} \Longrightarrow \left\{\left[\left(1-\frac{1}{\frac{n}{K}}\right)^{\frac{n}{K}}\right]^{\frac{K}{n}}\right\}^m \Longrightarrow \left(\frac{1}{e}\right)^{K\cdot\frac{m}{n}} = e^{-10} \Longrightarrow e^{-K\cdot\frac{m}{n}} = e^{-10}$$

$$\Downarrow$$

$$K\cdot\frac{m}{n} = 10$$

$$\Downarrow$$

$$K = \frac{10\cdot n}{m}$$