محاسبات زیر برای طول l =1 و t =1 در نظر گرفته شده است:

$$P_N = \sum_0^{\inf} \binom{N}{n_r} p^{n_r} q^{n_l}$$

$$\begin{cases} n_r - n_l = x \\ x = 2n_r - N \\ q + p = 1 \end{cases}$$

$$< x >= 2 < n_r > +N$$
$$< n_r >= n_r P_N = \sum_0^{\inf} \binom{N}{n_r} n_r p^{n_r} q^{n_l}$$
$$< n_r >= p((\partial_p)\, P_N = p\,(\partial_p)\,(p+q)^N = Np\,(p+q)^{N-1} = Np$$

$$< x >= 2 < n_r > -N = N(2p-1) = N(p-q) \Rightarrow < x >^2 = N^2\,(p-q)^2$$

$$if\ \ x = 2n_r - N \Rightarrow \sigma_x^2 = 4\sigma_{nr}^2$$

$$\sigma_{nr}^2 =< n_r^2 > - < n_r >^2$$

$$< n_r^2 >= p(\partial_p\ p(\partial_p P_N)) = p(\left(\partial_p Np(p+q)^{N-1}\right) = N^2p^2 + Npq$$

$$\sigma_{nr}^2 = N^2p^2 + Npq - N^2p^2 = Npq \Rightarrow \sigma_x^2 = 4pqN$$

متن بالا با استفاده از LATEXنوشته شده با این سورس کد:

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\begin{equation}

P_N=\sum_{0}^{\inf}\binom{N}{n_r}p^{n_r}q^{n_l}\\

\\

left\{\begin{matrix}\

n_r - n_l = x

\\

x= 2n_r-N  \\

\\

q+p=1\\

\\

end{matrix}\right.\

\\

\\

\\

x>=2<n_r>+N\\>

n_r> = n_rP_N = \sum_{0}^{\inf}\binom{N}{n_r}n_rp^{n_r}q^{n_l}>

n_r> = p(\left ( \partial_p  \right )P_N = p\left ( \partial _p \right ) \left ( p+q \right )^{N}= N p\left ( p+q \right )^{N-1} = N p>\\

\\

x> =2<n_r>-N =N(2p - 1)= N(p-q)\displaystyle \Rightarrow <x>^{2} = N^{2}\left ( p-q \right )^{2}> \\

\\

if\  x = 2n_r -N \Rightarrow \sigma_x ^{2} = 4\sigma_n_r ^{2}\\ \\

sigma_n_r ^{2} = <n_r^{2}>-<n_r>^{2}\\\

\\

\\


n_r^2> = p( \partial_p \ p( \partial_p P_N))  = p(\left ( \partial_p  Np(p+q)^{N-1}\right ) = N^2p^2 +N p q >

\\

\\

sigma_n_r^2 = N^2p^2 +N p q -N^2p^2  = N p q \Rightarrow \sigma_x^2 = 4pq N\

\end{equation}
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