

COMBI

Combinatory calculations

The screenshot shows a software window titled 'Combinatory' with a menu bar containing 'Info' and 'Colour'. The interface is divided into several sections:

- Variations (Vm,n):** Input m=7, n=3, result=210. Formula: $m \cdot (m-1) \cdots (m-n+1)$.
- Variations with repetition (VRm,n):** Input m=3, n=8, result=6561. Formula: $VR = m^n$.
- Permutations (Pn):** Input n=9, result=362880. Formula: $Pn = n!$.
- Perm. with repetition (PR m,n1,n2...):** Input m=14, result=18018. Formula: $PR = \frac{m!}{n_1! n_2! \cdots n_k!}$.
- Combinations (Cm,n):** Input m=5, n=3, result=10. Formula: $C = \frac{m!}{n! (m-n)!}$.
- Combinations with repetition (CRm,n):** Input m=5, n=3, result=35. Formula: $CR = \frac{(m+n-1)!}{n! (m-1)!}$.
- Newton binomial:** Input n=7. A table shows binomial coefficients $C_{n,i}$ for i from 0 to 6. Formula: $(a+b)^n = \sum_{i=0}^n C_{n,i} \cdot a^{n-i} \cdot b^i$.

External labels with arrows point to specific sections: 'Ordinary variations' (to Variations), 'Variations with repetition' (to VRm,n), 'Permutations' (to Pn), 'Permutations with repetition' (to PR), 'Combinations' (to Cm,n), 'Combinations with repetition' (to CRm,n), and 'Newton Binomial: combinatory numbers C_{n,i} of $\sum C_{n,i} \cdot a^{n-i} \cdot b^i$ ' (to the Newton binomial section).

The image is quite self-explanatory: once introduced the values of m, n, etc. is obtained the result pressing the button " = ".

Only requires some comment the case:

Permutations with repetition (PR):

PR(m, n₁, n₂..n_k) is the number of groups of m elements ordering them in all the possible ways inside the subsets of n₁... n_k elements (n₁ +...+ n_k = m)

The numbers n₁... n_k are introduced, one by one, in the stall with dropdown list and they are accepted with " return". they can be reedited and deleted selecting them in the list (Remember you that their sum must be = m)

