Derangement, Partial Derangement

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1 DEFINITION

A derangement is a permutation of the elements of a set, such that no element appears in its original position. [**?**]

2 NOTATION

The number of derangement of a set of size n, usually written D_n, d_n, or $!n$, is called the "derangement number" or "de Montmort number". (These numbers are generalized to rencontres numbers). [**?**]

The number of derangements of an n-element set is called the nth derangement number or rencontres number, or the subfactorial of n and is sometimes denoted $!n$ or D_n

3 FORMULA DERANGEMENT

$$d_n = n! \sum_{i=0}^{n} \frac{(-1)^i}{i!}$$

4 FORMULA PARTIAL DERANGEMENT

La formula precendente è utilizzata quando vogliamo il numero delle permutazioni (o casi favorevoli, a volte negli esercizi) che hanno fixed point uguale a 0. In generale per $k > 0$ dove k rappresenta il numero di fixed point, la formula diventa:

$$d_{n,k} = \frac{n!}{k!} \sum_{i=0}^{n} \frac{(-1)^i}{i!}$$

5 NOTE

In altre parole, il derangment è un sottoinsieme dell'insieme delle permutazioni formato dalle permutazioni che non hanno punti fissi, cioè in cui nessun elemento è al suo posto.

6 HISTORY

The problem of counting derangements was first considered by Pierre Raymond de Montmort in 1708; he solved it in 1713, as did Nicholas Bernoulli at about the same time. [**?**]

7 APPROFONDIMENTI

- WIKIPEDIA: Derangement
- DISPENSA: Derangement.pdf
- OEIS: Number of derangement