Sequences and Series

arithmetic sequence: common difference d

$$u_n = u_1 + (n-1)\cdot d$$

$$S_n = \frac{n}{2}(2u_1 + (n-1)d) = \frac{n}{2}(u_1 + u_n)$$ → series

(sum of n terms in sequence)

geometric sequence: common ratio r

$$u_n = u_1 \cdot r^{n-1}$$

$$S_n = \frac{u_1(1-r^n)}{1-r} = \frac{u_1(r^n-1)}{r-1} \quad (r \neq 1)$$

percentage change in real terms

$r = c - i$

c: percentage change, i: inflation

compound interest = Zinseszins

sum to infinity:

for geometric sequence with $|r| < 1$

$$S_\infty = \frac{u_1}{1-r}$$

for binomial expansion:

^nC_r (n, r)

Zeile Spalte

(Bei 0 beginnend)

$$\binom{n}{r} = {}^nC_r = \frac{n!}{r!\,(n-r)!}$$

Counting principles

permutations (ways to arrange n elements)

$$n!$$

combinations (pick r items from n items, order does not matter)

$$\binom{n}{r} = {}_nC_r = \frac{n!}{r!(n-r)!}$$

`nCr()

(pick r items from n items, order does matter)

$${}_nP_r = \frac{n!}{(n-r)!}$$

`nPr()