

G.2 Rekker med binomialkoeffisienter

$$(G.2.1) \quad \sum_{k=0}^n \binom{n}{k} a^{n-k} b^k = (a+b)^n$$

$$(G.2.2) \quad \sum_{k=0}^n \binom{n}{k} = \binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \dots + \binom{n}{n} = 2^n$$

$$(G.2.3) \quad \sum_{k=0}^n (-1)^k \binom{n}{k} = 0$$

$$(G.2.4) \quad \sum_{k=0}^n 2^k \binom{n}{k} = 3^n$$

$$(G.2.5) \quad \binom{n}{k} = \binom{n-1}{k} + \binom{n-1}{k-1} \quad \text{Pascals identitet}$$

$$(G.2.6) \quad \sum_{k=0}^r \binom{m}{r-k} \binom{n}{k} = \binom{m+n}{r} \quad \text{Vandermondes identitet}$$

$$(G.2.7) \quad \sum_{k=0}^n \binom{n}{k}^2 = \binom{2n}{n}$$

$$(G.2.8) \quad \sum_k k \binom{m}{k} \binom{n}{k} = n \binom{m+n-1}{n}, \quad 1 \leq k \leq \min(m, n)$$

$$(G.2.9) \quad \sum_{k=0}^m \binom{n+k}{k} = \binom{n+m+1}{m} \quad \sum_{k=0}^n \binom{n+k}{k} = \binom{2n+1}{n+1} = \binom{2n+1}{n}$$

$$(G.2.10) \quad \sum_{k=0}^m \binom{n+k}{n} = \binom{n+m+1}{n+1} \quad \sum_{k=0}^n \binom{n+k}{n} = \binom{2n+1}{n} = \binom{2n+1}{n+1}$$