# EXAMPLES FOR THE WZ-METHOD
## (FROM "GENERATINGFUNCTIONOLOGY" BY HERBERT WILF)

**Theorem.** $\sum_k (-1)^k \binom{n}{k} / \binom{k+a}{k} = a/(n+a)$  $(n \geq 0)$

Proof: Take $R(n,k) = k/(n+a)$.

**Theorem.** $\sum_k (-1)^{n-k} \binom{2n}{k}^2 = \binom{2n}{n}$  $(n \geq 0)$

Proof: Take $R(n,k) = -(10n^2 - 6kn + 17n + k^2 - 5k + 7)/(2(2n - k + 2)^2)$.

**Theorem.** *(Dixon's identity)*

$$\sum_k (-1)^k \binom{n+b}{n+k}\binom{n+c}{c+k}\binom{b+c}{b+k} = \frac{(n+b+c)!}{n!\,b!\,c!}.$$

Proof: Take $R(n,k) = (c+1-k)(b+1-k)/(2(n+k)(n+b+c+1))$.