

Some finite sums involving $(q)_n$

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In this talk we shall present an elementary method to derive finite sums involving $(q)_n$. For instance combining this method with a well-known result of Euler we find that for all positive integer n and all complex number q in the unit disk

$$\sum_{k=1}^n (-1)^{k-1} \frac{1}{1-q^k} \cdot \frac{q^{\frac{(n-k)(n-k-1)}{2}}}{(q)_{n-k}} = \frac{nq^{\frac{n(n-1)}{2}}}{(q)_n}.$$