

Sums.

While working on a question I ran into a summation I did not know how to handle. So I'd like to spend the next couple of posts looking at sums in general. Today I'll start with an exercise from Concrete Mathematics. We are asked:

What does the notation

$$\sum_{k=4}^0 q_k$$

mean?

We observe

$$\begin{aligned} & \langle \Sigma k : 4 \leq k \leq 0 : q_k \rangle \\ &= \{ \leq \text{conjunctive} \} \\ & \langle \Sigma k : 4 \leq k \wedge k \leq 0 : q_k \rangle \\ &= \{ \text{arithmetic} \} \\ & \langle \Sigma k : \text{false} : q_k \rangle \\ &= \{ \text{empty range} \} \\ & 0 \end{aligned}$$

E. Emmanuel Macaulay
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