

Idea of the construction of $\mathbf{p}_k(n)$, cont

Then

$$\mathbf{p}_k(n) = f(n, k) \cdot \Pr(B_k \text{ given } A_k).$$

If $n \mid k$, we have that $k \mid (a + b)$ and $(b + c)$ implies that $k \mid a, b, c$. Then choosing the blocks a, b, c partitioning n is equivalent to choosing blocks $a/k, b/k, c/k$ partitioning n/k .

Then $\Pr(B_k \text{ given } A_k) = \mathbf{p}(n/k)$, so

$$\mathbf{p}_k(n) = f(n, k)\mathbf{p}(n/k).$$