Resolveremos o problema

$$y_1 + y_2 + \dots + y_N = 1$$

$$-p \le y_k \le p \qquad k = 1, 2, \dots, N$$

MUDANDO VARIÁVEIS $\qquad y_k = x_k - 1 - p$

$$x_1 - 1 - p + x_2 - 1 - p + \dots + x_N - 1 - p = 1$$

$$\boxed{x_1 + x_2 + \dots + x_N = 1 + N(p+1)}$$

$$x_k \le 2p + 1$$

Total sem limitações superiores $\binom{N(p+1)}{N-1}$

$G_k\,(>2p+1)$ $\quad \binom{N(p+1) - (2p+1)}{N-1}$ teremos $\binom{N}{1}$ possibilidades

$G_{kl}\,(>2(2p+1))$ $\quad \binom{N(p+1) - 2(2p+1)}{N-1}$ teremos $\binom{N}{2}$ possibilidades

Resultado final será uma serie que termina quando

$$N(p+1) - r(2p+1) = N - 1$$

$$r = \mathrm{INT}\left(\frac{Np+1}{2p+1}\right)$$

$$\sum_{r=0}^{\mathrm{INT}\left(\frac{Np+1}{2p+1}\right)} (-1)^r \binom{N}{r} \binom{N(p+1) - r(2p+1)}{N-1}$$

EXEMPLOS $\quad$ $N=2 \quad p=3$ $\qquad \mathrm{INT}\left(\frac{Np+1}{2p+1}\right) = \mathrm{INT}\left(\frac{7}{7}\right) = 1$

$$\sum_{r=0}^{1} (-1)^r \binom{2}{r} \binom{8-7r}{1} = \binom{8}{1} - 2\binom{1}{1} = 6$$

$N=4 \quad p=3$ $\qquad \mathrm{INT}\left(\frac{13}{7}\right) = 1$

$$\sum_{r=0}^{1} (-1)^r \binom{4}{r} \binom{16-7r}{3} = \binom{16}{3} - 4\binom{9}{3}$$

$$= \frac{16 \cdot \cancel{15}^{5} \cdot \cancel{14}^{7}}{\cancel{3 \cdot 2}} - \cancel{4}^{2}\,\frac{\cancel{9}^{3} \cdot 8 \cdot 7}{\cancel{3 \cdot 2}}$$

$$= 16 \cdot (35 - 21)$$

$$= 16 \cdot 14 = 224$$

p \ N	1	2	3	4	5
1	1	2	6	16	45
2	1	4	18	80	365
3	1	6	36	224	1420
4	1	8	60	480	3900
5	1	10	90	880	8725