

Case A

We have  $a_1 \geq 2$ ,  $a_2 \geq 2$  and  $a_3 \geq 3$ . and

$$f(a_1, a_2, a_3) = a_3(a_1-2)+a_1(a_3-2)+a_2(a_1-1)+a_1a_2+\frac{a_1a_2(a_3-2)+2}{a_3-1}+\frac{a_1a_3(a_3-1)}{1+a_3(a_2-1)}+2,$$

Case B

We have  $a_1 \geq 2$ ,  $a_2 \geq 2$  and  $a_3 \geq 2$

$$\begin{aligned} f(a_1, a_2, a_3) = & + \frac{a_1a_2(a_1-2)(a_3-2) + \frac{a_1a_3(a_2-2)}{2} + \frac{a_2(a_1a_3-4)}{2}}{1-a_1+a_1a_3} \\ & + \frac{a_2a_3(a_2-2)(a_1-2) + \frac{a_1a_2(a_3-2)}{2} + \frac{a_3(a_1a_2-4)}{2}}{1-a_2+a_1a_2} \\ & + \frac{a_1a_3(a_2-2)(a_3-2) + \frac{a_2a_3(a_1-2)}{2} + \frac{a_1(a_2a_3-4)}{2}}{1-a_3+a_2a_3} + 1, \end{aligned}$$