

$$\begin{aligned}
& 3 \left(\frac{9}{(-1+r)^3} + \frac{3 \times 2^{-\alpha_1}}{(-1+r)^2} + \frac{3 \times 2^{-\alpha_2}}{(-1+r)^2} + \frac{3 \times 2^{-\alpha_3}}{(-1+r)^2} - \frac{3 \cos\left[\frac{\pi \alpha_3}{3}\right]}{(-1+r)^2} - \right. \\
& \frac{3 \times 2^{-\alpha_2} \cos\left[\frac{\pi \alpha_3}{3}\right]}{-1+r} + \frac{3 \sqrt{3} \sin\left[\frac{\pi \alpha_1}{3}\right]}{(-1+r)^2} + \frac{2^{1-\alpha_2} \sqrt{3} \sin\left[\frac{\pi \alpha_1}{3}\right]}{-1+r} + \frac{2^{-\alpha_3} \sqrt{3} \sin\left[\frac{\pi \alpha_1}{3}\right]}{-1+r} - \\
& 2^{-\alpha_2} \sqrt{3} \cos\left[\frac{\pi \alpha_3}{3}\right] \sin\left[\frac{\pi \alpha_1}{3}\right] - \frac{\sqrt{3} \cos\left[\frac{\pi \alpha_3}{3}\right] \sin\left[\frac{\pi \alpha_1}{3}\right]}{-1+r} + \frac{3 \sqrt{3} \sin\left[\frac{\pi \alpha_2}{3}\right]}{(-1+r)^2} + \\
& \frac{2^{-\alpha_1} \sqrt{3} \sin\left[\frac{\pi \alpha_2}{3}\right]}{-1+r} + \frac{2^{1-\alpha_3} \sqrt{3} \sin\left[\frac{\pi \alpha_2}{3}\right]}{-1+r} + 2^{-\alpha_1} \sqrt{3} \cos\left[\frac{\pi \alpha_3}{3}\right] \sin\left[\frac{\pi \alpha_2}{3}\right] + \\
& \frac{\sqrt{3} \cos\left[\frac{\pi \alpha_3}{3}\right] \sin\left[\frac{\pi \alpha_2}{3}\right]}{-1+r} + 3 \times 2^{-\alpha_3} \sin\left[\frac{\pi \alpha_1}{3}\right] \sin\left[\frac{\pi \alpha_2}{3}\right] + \frac{3 \sin\left[\frac{\pi \alpha_1}{3}\right] \sin\left[\frac{\pi \alpha_2}{3}\right]}{-1+r} + \\
& \frac{3 \sqrt{3} \sin\left[\frac{\pi \alpha_3}{3}\right]}{(-1+r)^2} + \frac{2^{1-\alpha_1} \sqrt{3} \sin\left[\frac{\pi \alpha_3}{3}\right]}{-1+r} + \frac{2^{-\alpha_2} \sqrt{3} \sin\left[\frac{\pi \alpha_3}{3}\right]}{-1+r} + 3 \times 2^{-\alpha_2} \sin\left[\frac{\pi \alpha_1}{3}\right] \sin\left[\frac{\pi \alpha_3}{3}\right] + \\
& \frac{3 \sin\left[\frac{\pi \alpha_1}{3}\right] \sin\left[\frac{\pi \alpha_3}{3}\right]}{-1+r} + 3 \times 2^{-\alpha_1} \sin\left[\frac{\pi \alpha_2}{3}\right] \sin\left[\frac{\pi \alpha_3}{3}\right] + \frac{3 \sin\left[\frac{\pi \alpha_2}{3}\right] \sin\left[\frac{\pi \alpha_3}{3}\right]}{-1+r} + \cos\left[\frac{\pi \alpha_1}{3}\right] \\
& \left(-\frac{3}{(-1+r)^2} - \frac{3 \times 2^{-\alpha_3}}{-1+r} + 3 \left(2^{-\alpha_3} + \frac{1}{-1+r} \right) \cos\left[\frac{\pi \alpha_2}{3}\right] + 3 \left(2^{-\alpha_2} + \frac{1}{-1+r} \right) \cos\left[\frac{\pi \alpha_3}{3}\right] - \right. \\
& \left. 2^{-\alpha_3} \sqrt{3} \sin\left[\frac{\pi \alpha_2}{3}\right] - \frac{\sqrt{3} \sin\left[\frac{\pi \alpha_2}{3}\right]}{-1+r} + 2^{-\alpha_2} \sqrt{3} \sin\left[\frac{\pi \alpha_3}{3}\right] + \frac{\sqrt{3} \sin\left[\frac{\pi \alpha_3}{3}\right]}{-1+r} \right) + \\
& \cos\left[\frac{\pi \alpha_2}{3}\right] \left(3 \left(2^{-\alpha_1} + \frac{1}{-1+r} \right) \cos\left[\frac{\pi \alpha_3}{3}\right] + \sqrt{3} \left(2^{-\alpha_3} + \frac{1}{-1+r} \right) \sin\left[\frac{\pi \alpha_1}{3}\right] - \right. \\
& \left. \left. \frac{2^{-\alpha_1} (-1 + 2^{\alpha_1} + r) \left(3 + \sqrt{3} (-1 + r) \sin\left[\frac{\pi \alpha_3}{3}\right] \right)}{(-1+r)^2} \right) \right) \right) = 0
\end{aligned}$$