

Gegeben ist

$$\sum_{r=0}^R \frac{1}{2^r}$$

$$s_r = \left(\frac{1}{2}\right)^0 + \left(\frac{1}{2}\right)^1 + \left(\frac{1}{2}\right)^2 + \dots + \left(\frac{1}{2}\right)^R \quad (1)$$

$$\frac{1}{2}s_r = \left(\frac{1}{2}\right)^1 + \left(\frac{1}{2}\right)^2 + \dots + \left(\frac{1}{2}\right)^{R+1} \quad (2)$$

$$\frac{1}{2}s_r - s_r = \left(\frac{1}{2}\right)^{R+1} - \left(\frac{1}{2}\right)^0 \quad (3)$$

$$s_r = \frac{\left(\frac{1}{2}\right)^{R+1} - \left(\frac{1}{2}\right)^0}{-\frac{1}{2}} \quad (4)$$

$$= 2 - \frac{1}{2^R} \quad (5)$$