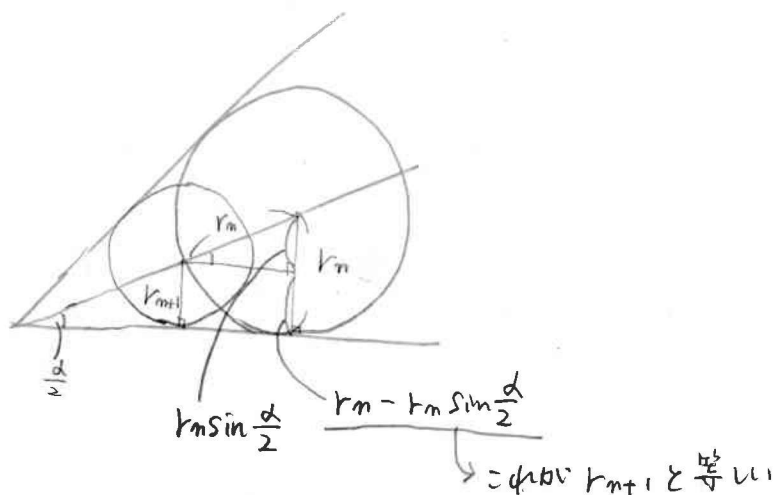


半径を r とし n 番目の半径を r_n , $(n+1)$ 番目の半径を r_{n+1} とする



$$r_{n+1} = r_n - r_n \sin \frac{\alpha}{2}$$

$$= (1 - \sin \frac{\alpha}{2}) r_n$$

したがって半径を表す数列は初項 $r_1 = \sin \frac{\alpha}{2}$, 公比 $(1 - \sin \frac{\alpha}{2})$ の等比数列

$$r_n = \sin \frac{\alpha}{2} \cdot (1 - \sin \frac{\alpha}{2})^{n-1}$$

この面積を表す数列を S_n とすると

$$S_n = (\sin \frac{\alpha}{2})^2 \pi (1 - \sin \frac{\alpha}{2})^{2(n-1)}$$

この無限級数和は

$$\frac{(\sin \frac{\alpha}{2})^2 \pi}{1 - (1 - \sin \frac{\alpha}{2})^2} = \frac{\pi \sin^2 \frac{\alpha}{2}}{2 \sin \frac{\alpha}{2} - \sin^2 \frac{\alpha}{2}} = \frac{\pi \sin \frac{\alpha}{2}}{2 - \sin \frac{\alpha}{2}}$$

$$\frac{\pi \sin \frac{\alpha}{2}}{2 - \sin \frac{\alpha}{2}}$$