

$$\theta = \tan^{-1} \left( \frac{1 + \tan \left( \sqrt{\left( \frac{r_3}{r_2} \right)^2 - 1} \right)}{\tan \left( \sqrt{\left( \frac{r_3}{r} \right)^2 - 1} \right) - \sqrt{\left( \frac{r_3}{r} \right)^2 - 1}} \right) \quad \text{--- ①}$$

$$r = r_3 \cos \left( \frac{\pi}{9} \right) \quad \text{--- ②}$$

②  $\leadsto$  ①

$$\theta = \tan^{-1} \left( \frac{1 + \tan \left( \sqrt{\left( \csc \frac{\pi}{9} \right)^2 - 1}}{\tan \left( \sqrt{\left( \csc \frac{\pi}{9} \right)^2 - 1} \right) - \sqrt{\left( \csc \frac{\pi}{9} \right)^2 - 1}} \right)$$

$$= \text{constant}$$

