OA2METPDS **Calculation of n and K from input values P and Δ for exact and approximate expressions**

$k := 1, 2 .. 40 \qquad \Delta := 114 \qquad P := 0.50 \qquad i := \sqrt{-1}$

$\theta_k := k \cdot 2 \qquad \psi := \operatorname{atan}(P)$

1. Exact Expression

$$z_k := \sqrt{\sin\left(\frac{2\cdot\pi\cdot\theta_k}{360}\right)^2 + \left[\left[\frac{\left(\cos(2\cdot\psi) + i\cdot\sin\left(\frac{2\cdot\pi\cdot\Delta}{360}\right)\cdot\sin(2\cdot\psi)\right)\cdot\left(\sin\left(\frac{2\cdot\pi\cdot\theta_k}{360}\right)^2\right)}{\cos\left(\frac{2\cdot\pi\cdot\theta_k}{360}\right)\cdot\left(\cos\left(\frac{2\cdot\pi\cdot\Delta}{360}\right)\cdot\sin(2\cdot\psi) + 1\right)}\right]\right]^2}$$

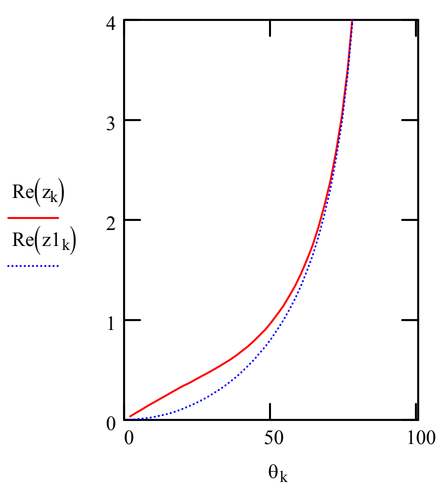
$n_k := \operatorname{Re}(z_k) \qquad K_k := \operatorname{Im}(z_k)$

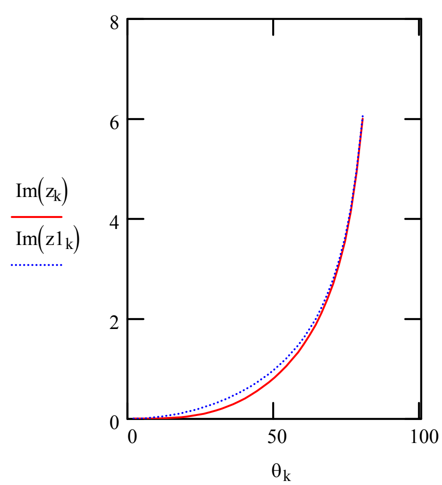
2. For the approximation one disregrads the sin^2 term

$$z1_k := \left[\left[\frac{\left(\cos(2\cdot\psi) + i\cdot\sin\left(\frac{2\cdot\pi\cdot\Delta}{360}\right)\cdot\sin(2\cdot\psi)\right)\cdot\left(\sin\left(\frac{2\cdot\pi\cdot\theta_k}{360}\right)^2\right)}{\cos\left(\frac{2\cdot\pi\cdot\theta_k}{360}\right)\cdot\left(\cos\left(\frac{2\cdot\pi\cdot\Delta}{360}\right)\cdot\sin(2\cdot\psi) + 1\right)}\right]\right]$$

$nn_k := \operatorname{Re}(z1_k) \qquad KK_k := \operatorname{Im}(z1_k)$

3. Comparison





4. The approximation can be written as two real expressions

$$nn_k := \frac{\left(\sin\left(\frac{2\cdot\pi\cdot\theta_k}{360}\right)^2\cdot\cos(2\cdot\psi)\right)}{\cos\left(\frac{2\cdot\pi\cdot\theta_k}{360}\right)\cdot\left(1+\cos\left(\frac{2\cdot\pi\cdot\Delta}{360}\right)\cdot\sin(2\cdot\psi)\right)}$$

and

$$KK_k := \frac{\sin\left(\frac{2\cdot\pi\cdot\theta_k}{360}\right)^2\cdot(\sin(\Delta)\cdot\sin(2\cdot\psi))}{\cos\left(\frac{2\cdot\pi\cdot\theta_k}{360}\right)\cdot\left(1+\cos\left(\frac{2\cdot\pi\cdot\Delta}{360}\right)\cdot\sin(2\cdot\psi)\right)}$$

5. Comparison of all three