$$\frac{\pi}{2} = \sum_{k=0}^{\infty} \frac{2^k \, k!^2}{(2k+1)!}$$

Let $S_m = \sum_{k=0}^{m} \frac{2^k k!^2}{(2k+1)!}$

$$S_{m+1} = S_m + T_{m+1}$$

Where

$$T_k = \frac{2^k (k!)^2}{(2k+1)!}$$

1) T_{k+1} in Terms of T_k

$$T_{k+1} = \frac{2^{k+1} (k+1)!^2}{(2k+3)!}$$

$$= \frac{2 \cdot 2^k \cdot (k+1)^2 \cdot (k!)^2}{(2k+3) \cdot (2k+2) \cdot (2k+1)!}$$

$$= \frac{2 \cdot (k+1)^2}{(2k+3) \cdot (2k+2)} \cdot T_k$$

$$= \frac{k+1}{2k+3} \cdot T_k$$

2) Optimizing FLOPS

Let $x = k+1$, $y = 2k+3$

For each iteration:

$$\left.\begin{aligned} T_{k+1} &= \frac{x}{y} \cdot T_k \\ x &= x+1 \\ y &= y+2 \\ S_{k+1} &= S_k + T_{k+1} \end{aligned}\right\} \text{5 FLOPS}$$