**Answer on Question #50232, Math, Complex Analysis**

Find the sum of the power series n from 0 to ∞ ∑ {(-1)^n / (2n)! } . ( z- { pi/2} ) ^2 afterward compute the sum of the series n from 0 to ∞ ∑ 1 / (2n)!

**Solution:**

$$\sum_{n=0}^{\infty}\frac{(-1)^n}{(2n)!}(z-\pi/2)^2=(z-\pi/2)^2\sum_{n=0}^{\infty}\frac{(-1)^n}{(2n)!}$$

It is known that Taylor series for $e^x=\sum_{n=0}^{\infty}\frac{x^n}{n!}$, where $|x|<\infty$

So $\sum_{n=0}^{\infty}\frac{(-1)^n}{(2n)!}=-\frac{1}{1!}+\frac{1}{2!}-\frac{1}{4!}+....=\frac{e^{j1}+e^{-j1}}{2j}=\cos(1)$, than

$$\sum_{n=0}^{\infty}\frac{(-1)^n}{n!}(z-\pi/2)^2=(z-\pi/2)^2\sum_{n=0}^{\infty}\frac{(-1)^n}{(2n)!}=(z-\pi/2)^2\cos(1)$$

$$\sum_{n=0}^{\infty}\frac{1}{(2n)!}=\frac{1}{1!}+\frac{1}{2!}+\frac{1}{4!}+....=\frac{e^1+e^{-1}}{2}=\cosh(1)$$

**Answer:** $\sum_{n=0}^{\infty}\frac{(-1)^n}{n!}(z-\pi/2)^2=(z-\pi/2)^2\cos(1)$ ; $\sum_{n=0}^{\infty}\frac{1}{(2n)!}=\cosh(1)$