BY GIMUSI 19/05/16

(-1)^n {arctan[(n+sin(n!)) / (n^2 + sin((n!)^2))] }

$$\sum_{n=1}^{+\infty} a_n = \sum_{n=1}^{+\infty} (-1)^n \text{ARCTAN}\left[\frac{n+\sin(n!)}{n^2+\sin((n!)^2)}\right]$$ CONVERGE

BRUTAL MODE $\sum_{n=1}^{+\infty} a_n \sim \sum_{n=1}^{+\infty} \frac{(-1)^n}{n}$

PONIAMO $\omega(n) = \frac{n+\sin(n!)}{n^2+\sin((n!)^2)} \to 0^+$

$$\sum_{n=1}^{+\infty} a_n = \underbrace{\sum_{n=1}^{+\infty} (-1)^n (\text{ARCTAN}(\omega(n)) - \omega(n))}_{\text{CONVERGE}} + \underbrace{\sum_{n=1}^{+\infty} (-1)^n \omega(n)}_{\text{CONVERGE}}$$

$\sum_{n=1}^{+\infty} (-1)^n (\text{ARCTAN}(\omega(n)) - \omega(n))$ ASS. CONV. PER C.A. CON $\omega(n)^3$

$$\sum_{n=1}^{+\infty} (-1)^n \omega(n) = \underbrace{\sum_{n=1}^{+\infty} (-1)^n \left(\omega(n) - \frac{1}{n}\right)}_{\text{CONVERGE}} + \underbrace{\sum_{n=1}^{+\infty} (-1)^n \frac{1}{n}}_{\text{CONVERGE}}$$

$\sum_{n=1}^{+\infty} (-1)^n \left(\omega(n) - \frac{1}{n}\right)$ ASS. CONV. PER C.A. CON $\frac{1}{n^{3/2}}$

$$\frac{|\omega(n) - 1/n|}{1/n^{3/2}} = n^{3/2}\left|\frac{n+\sin(n!)}{n^2+\sin((n!)^2)} - \frac{1}{n}\right| =$$

$$= n^{3/2}\left|\frac{\cancel{n^2}+n\sin(n!) - \cancel{n^2} - \sin((n!)^2)}{n^3+n\sin((n!)^2)}\right| \to 0$$