

$$a_m = (-1)^m \cdot \frac{2}{m^2 - 1} \quad m \in \mathbb{N} \setminus \{1\}$$

m PARI $\rightarrow (-1)^m = 1$

$$a_m = \frac{2}{m^2 - 1}$$

$$a_0 = \frac{2}{-1} = -2$$

$$a_2 = \frac{2}{3}$$

$$a_4 = \frac{2}{15}$$

$$a_m > a_{(m+1)}$$

$$\frac{\cancel{2}^1}{m^2 - 1} > \frac{\cancel{2}^1}{(m+1)^2 - 1}$$

DIVIDO TUTTO
PER "2"

INVERTO

$$m^2 - 1 < (m+1)^2 - 1$$

$$\cancel{m^2} < \cancel{m^2} + 2m + 1$$

$$0 < 2m + 1$$

$\forall m$ PARI

$$a_2 = \frac{2}{3}$$

$$a_0 = -2$$

$$a_4 = \frac{2}{15}$$

$$\lim_{m \rightarrow +\infty} \frac{2}{m^2 - 1} = 0$$

m dispari $\rightarrow (-1)^m = -1$

$$a_m = - \frac{2}{m^2 - 1}$$

Si CONE $\frac{2}{m^2 - 1}$ DECRESCe ALORA $-\frac{2}{m^2 - 1}$ CRESCe

$$a_3 = - \frac{2}{8} = - \frac{1}{4}$$

$$a_5 = - \frac{2}{24} = - \frac{1}{12}$$

$\lim_{m \rightarrow +\infty} - \frac{2}{m^2 - 1} = 0$

$a_3 = -\frac{1}{4}$ $\rightarrow$

INSIEME

$a_0 = -2$ $\rightarrow$ $a_2 = \frac{2}{3}$ $\rightarrow$ 0

$a_3 = -\frac{1}{4}$ $\rightarrow$ 0

$a_0 = -2$ MINIMO $a_2 = \frac{2}{3}$ MASSIMO

05.02.2025

$$a_m = 2m - \left(3 + (-1)^m \right) m^{m+1} \quad m \in \mathbb{N} - \{0\}$$

m PARI $\rightarrow (-1)^m = 1$ $(-1)^{m+1} = -1$ $m+1 \rightarrow$ DISPARI

n PARI $\rightarrow (-1)^n = 1$ $(-1)^{n+1} = -1$ $n+1 \rightarrow$ DISPARI

$$a_m = 2m - (3+1)m^{-1}$$

$$a_m = 2m - \frac{4}{m}$$

PROVE $a_2 = 4 - 2 = 2$

$$a_4 = 8 - 1 = 7$$

$$a_6 = 12 - \frac{4}{3} = 12 - \frac{2}{3} = \frac{34}{3}$$

$$a_m < a_{(m+1)}$$

$$2m - \frac{4}{m} < 2(m+1) - \frac{4}{(m+1)}$$

$$\cancel{2m} - \frac{4}{m} < \cancel{2m} + 2 - \frac{4}{m+1}$$

$$\frac{4}{m+1} - \frac{4}{m} - 2 < 0 \quad \text{m.c.m.}$$

$$\frac{4m - 4(m+1) - 2m(m+1)}{m(m+1)} < 0$$

$$\frac{\cancel{4m} - \cancel{4m} - 4 - 2m^2 - 2m}{\cancel{m(m+1)}} < 0$$

SETIPRE POSITIVA

$$-4 - 2m^2 - 2m < 0 \quad \forall m$$

$$a_2 = 2 \rightarrow \dots \lim_{n \rightarrow +\infty} \left(2n - \underbrace{\left(\frac{4}{n} \right)}_{\downarrow 0} \right) = \infty$$

$$n \text{ dispari} \rightarrow (-1)^n = -1 \quad (-1)^{n+1} = 1$$

$$a_n = 2n - (3-1)n^1$$

$$a_n = 2n - 2n = 0 \quad \forall n \in \mathbb{N}_0$$

n PAIR

n DISPARI

$$a_2 = \boxed{2} \rightarrow \boxed{+\infty} \text{ SUP}$$

$$a_n = \boxed{0} \text{ MINIMO}$$

PER VOI: STUDIARE CONVERGENZA,
MONOTONIA, DETERMINARE
SUP/INF/MAX MIN
E SPECIFICARE COSA SONO

$$a_n = \frac{n^2 + n(-1)^n}{n^3 + 1}$$

ATTENTI

$$A \quad n^3 + 1$$

$$n^3 + 1 = n^3 + 1^3$$

→ SCOMPORRE

SUGGERIMENTO (SCOMPOSIZIONI)

$$\bullet n^2 + n = n \cdot (n + 1)$$

$$\bullet n^2 - 1 = (n + 1) \cdot (n - 1)$$

$$\bullet A^3 + B^3 = (A + B) \cdot (A^2 - AB + B^2)$$

$$\bullet A^3 - B^3 = (A - B) \cdot (A^2 + AB + B^2)$$

$$a_n = \frac{n^2 - \sin(n\pi)}{n^3 + 1}$$

SUGGERIMENTO

VERI GLI ANGOLI $n\pi$

$$a_m = \frac{m^2 - \sin(m\pi)}{m + m^2}$$

SUGGERIMENTO

• VEDI GLI ANGOLI $m\pi$
DOVE SONO MESSI

• CAPISCI IL VALORE DI
 $\sin(m\pi)$

TROVERAI UNA BELLA SORPRESA

$$a_m = \frac{\sqrt{m+1} - \sqrt{m-1}}{m}$$

$m \in \mathbb{N} - \{0\}$

SUGGERIMENTO: RICORDA LA
RAZIONALIZZAZIONE

$$\begin{aligned} A-B &= (A-B) \cdot \frac{A+B}{A+B} \\ &= \frac{(A-B)(A+B)}{(A+B)} = \frac{A^2-B^2}{A+B} \end{aligned}$$

POI DIVENTA FACILE!

RICORDA se $a_m \rightarrow$ e $b_m \rightarrow$

ALLORA $a_m + b_m \rightarrow$

se $a_m \rightarrow$ ALLORA

$\frac{1}{a_m} \rightarrow$

$$a_m = \frac{m}{\sqrt{m-2} - \sqrt{m+2}}$$

$m \geq 2$

$$a_m = \ln\left(2 + \frac{1}{m}\right)$$

$m \in \mathbb{N} - \{0\}$

$$a_m = e^{\pi + \frac{1}{m}}$$

$m \in \mathbb{N} - \{0\}$

$$a_m = \frac{m + m \left(1 - \cos\left(\frac{(2m+1)\pi}{2}\right)\right)}{1 + m}$$

$m \in \mathbb{N}$

$\left. \begin{array}{l} \ln a_m \text{ ed} \\ e^{a_m} \text{ FANNO} \\ \text{QUELLO CHE} \\ \text{FA } a_m \end{array} \right\}$