

$$b_n = \begin{cases} \frac{1}{\sqrt{n}} & \text{if } n \text{ is odd} \rightarrow 0 \\ \frac{1}{n} & \text{if } n \text{ is even} \rightarrow 0 \end{cases}$$

Sequence $\langle b_n \rangle$ is convergent

When n is odd ∞

$$\sum b_n = \sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} = \sum_{n=1}^{\infty} \frac{1}{n^{1/2}}$$

by p-test series is divergent ($\because p = \frac{1}{2} < 1$)

$\Rightarrow \sum b_n = \sum \frac{1}{\sqrt{n}}$ is divergent

When n is even

$$\sum b_n = \sum \frac{1}{n} ; p = 1$$

Series is divergent

So sum of two divergent series is also divergent

$\Rightarrow \sum_{n=1}^{\infty} b_n$ is divergent