Problem:

Examine the convergence of the series:

$$\sum_{n=0}^{\infty} \frac{2n + n^5}{3n^7 - 7}.$$

Solution:

Let's note that this series is equivalent to the series $\sum_{n=0}^{\infty} \frac{1}{n^2}$, since $\frac{2n + n^5}{3n^7 - 7} : \frac{1}{n^2} = \frac{(2n + n^5)n^2}{3n^7 - 7} =$

$= \frac{1 + \frac{2}{n^4}}{3 - \frac{7}{n^7}} \underset{n\to\infty}{\longrightarrow} \frac{1}{3}$, but the series $\sum_{n=0}^{\infty} \frac{1}{n^2}$ converges ⇒ the initial series also converges.

Answer: converges.