

Properties of Sequences

Aim

To introduce the elementary properties of sequences.

Learning Outcomes

At the end of this section you will:

- Know some of the elementary properties of sequences.

The following are three of the elementary properties of sequences. For any given sequence, the following properties should hold.

1. If $\{a_n\}_{n=1}^{\infty} \rightarrow a$ and $\{b_n\}_{n=1}^{\infty} \rightarrow b$ are convergent sequences then $\{c_n\}_{n=1}^{\infty} \rightarrow a + b$ when $c_n = a_n + b_n$.
2. If $\{a_n\}_{n=1}^{\infty} \rightarrow a$ and $\{b_n\}_{n=1}^{\infty} \rightarrow b$ are convergent sequences then $\{c_n\}_{n=1}^{\infty} \rightarrow a \times b$ when $c_n = a_n \times b_n$.
3. If $\{a_n\}_{n=1}^{\infty} \rightarrow a$ and $\{b_n\}_{n=1}^{\infty} \rightarrow b$ are convergent sequences with $b \neq 0$ then $\{c_n\}_{n=1}^{\infty} \rightarrow \frac{a}{b}$ when $c_n = \frac{a_n}{b_n}$.

The following example can be used to test all three of the above elementary properties of sequences;

$$a_n = 1 + \frac{1}{n} \quad \text{and} \quad b_n = 1 - \frac{1}{n}$$

Related Reading

Gersting, J.L. 2007. *Mathematical Structures for Computer Science*. 6th Edition. Freeman & Company.