University of DJilaly Bounaama – khmis meliana - University — Year: 2024/2023
Faculty of Economic, Commercial and Management Sciences — Scale: Mathematics 1
First Year Bachelor's Degree - Joint Trunk - — Branch: 2

Series No. 02: Numerical Sequences

Exercise 01:

(u_n) sequential defined by $u_0 = 1$ and for each natural number n، $u_{n+1} = \frac{u_n}{u_n+1}$

1- Calculate the u_1 ، u_2 ، u_3 ، and then conclude the u_n phrase in n.

2- Prove the decline that for every natural number n $u_n = \frac{1}{n+1}$.

3- Study the direction of cascading change (u_n) and calculate its end.

Exercise 02:

We consider the numerical succession $(u_n)_{n\in\mathbb{N}}$ Knowledge of : $\begin{cases} u_0 = 3 \\ u_{n+1} = \frac{5u_n-4}{u_n+1} \end{cases}$

1- Between the following: $\forall n \in \mathbb{N} : u_n > 2$.

2- Study monotony $(u_n)_{n\in\mathbb{N}}$.

3- Infer convergence$(u_n)_{n\in\mathbb{N}}$.

Exercise 03:

(u_n) Numerical cascade defined as the first$u_0 = 6$ The regressive relationship $u_{n+1} = \frac{1}{3}u_n + 2$.

1- Check that for every natural number$n$: $u_{n+1} - 3 = \frac{1}{3}(u_n - 3)$.

2- Prove the decline that for every natural number n : $u_n \geq 3$.

3- Between successive (u_n) diminished, and then concluded her affinity.

4- We consider the numerical succession(v_n) Defined for each natural number n، :$v_n = u_n + \alpha$ Where α is a real number .

a. Find the real number of α where the cascade is(v_n) Engineering, the basis of which is required to be assigned to the first limit.

b. Write v_n in terms of n ، and concluded in writing. u_n in terms n ،and calcul $\lim\limits_{n\to+\infty} u_n$.