S'entrainer 16 page 141

Sésamath

Maths 1S

énoncé

Pour chacun des cas ci-dessous, démontrer que la suite (u_n) définie pour tout entier naturel n n'est pas monotone.

1. $u_n = 3n^2 - 3^n$
2. $\begin{cases} u_0 = 1 \\ u_{n+1} = (u_n - 1)^2 \end{cases}$
3. $u_n = \left(-\frac{1}{2}\right)^n$

correction

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   On calcule les premiers termes.

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$u_0 = 3 \times 0^2 - 3^0 = -1$;
$u_1 = 3 \times 1^2 - 3^1 = 0$;
$u_2 = 3 \times 2^2 - 3^2 = 3$;
$u_3 = 3 \times 3^2 - 3^3 = 0$

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   $u_1 < u_2$ et $u_2 > u_3$ donc la suite n'est pas monotone.

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$u_1 = (u_0 - 1)^2 = (1 - 1)^2 = 0$

$u_2 = (u_1 - 1)^2 = (0 - 1)^2 = 1$

$u_0 > u_1$ et $u_1 < u_2$ donc la suite n'est pas monotone.

3 $u_n = \left(-\frac{1}{2}\right)^n$

correction

3. $u_n = \left(-\frac{1}{2}\right)^n$

$$u_0 = \left(-\frac{1}{2}\right)^0 = 1$$

correction

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$$u_0 = \left(-\frac{1}{2}\right)^0 = 1$$

$$u_1 = \left(-\frac{1}{2}\right)^1 = -\frac{1}{2}$$

correction

3. $u_n = \left(-\frac{1}{2}\right)^n$

$$u_0 = \left(-\frac{1}{2}\right)^0 = 1$$

$$u_1 = \left(-\frac{1}{2}\right)^1 = -\frac{1}{2}$$

$$u_2 = \left(-\frac{1}{2}\right)^2 = \frac{1}{4}$$

correction

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$$u_0 = \left(-\frac{1}{2}\right)^0 = 1$$
$$u_1 = \left(-\frac{1}{2}\right)^1 = -\frac{1}{2}$$
$$u_2 = \left(-\frac{1}{2}\right)^2 = \frac{1}{4}$$

donc $u_0 > u_1$ et $u_1 < u_2$ donc la suite n'est pas monotone.