

Contrôle Terminal INFO1 - Semestre 2

Ressource R2.09 – Méthodes numériques



Exercice 1 : Un prof en manque d'inspiration cherche à utiliser les progrès de l'intelligence artificielle pour écrire un examen à sa place. Voici une capture de ses échanges ¹ avec l'IA ChatGPT.

Que pensez-vous de la réponse fournie? *Traduction : sequence \rightsquigarrow suite*

TH

find an example of a recurring sequence defined via a function that converges to a fixed point



Sure! Let's consider the recurring sequence defined by the function:

scss

Copy code

```
f(x) = 1 - abs(x)
```

The fixed point for this sequence is $x = 0$. Starting from any initial value other than 0 , the sequence will converge to the fixed point $x = 0$.

Here's an example Python program that demonstrates the convergence of this recurring sequence:

python

Copy code

```
def f(x):
    return 1 - abs(x)

def recurring_sequence(initial_value, iterations):
    sequence = [initial_value]

    for i in range(iterations):
        next_value = f(sequence[-1])
        sequence.append(next_value)

    return sequence

# Example usage
initial_value = 0.9
iterations = 10
sequence = recurring_sequence(initial_value, iterations)

# Print the sequence
for i, value in enumerate(sequence):
    print(f"Iteration {i}: {value}")
```

In this example, we start the sequence with an initial value of 0.9 and iterate 10 times. The `recurring_sequence` function calculates the next value of the sequence using the `f(x)` function, and the sequence is stored in a list. Finally, we print the sequence values for each iteration.

As you run the program, you'll observe that the values in the sequence gradually approach 0 , which is the fixed point for this recurring sequence.

1. authentiques!