Centre universitaire de Mila | année universitaire 2024/2025
Faculté des sciences et de technologie | ING GM
Département de EM et GM | Mathématique appliquée

Series N 2

Exercice 1 :

Demonstrate the convergence and calculate the value of the integrals:

$$I_1 = \int_0^{+\infty} t^3 e^{-t} dt\,;\ \ I_2 = \int_1^{+\infty} \frac{1}{t\sqrt{t^2+1}} dt\,;\ \ I_3 = \int_0^{+\infty} \frac{t\ln(t)}{(t^2+1)^2} dt$$

Exercice 2 :

Are the following improper integrals convergent or divergent?

$$I_1 = \int_2^{+\infty} \ln(t)\,dt\,;\ I_2 = \int_0^{2} \ln(t)\,dt\,; I_3 = \int_0^{+\infty} e^{-4t} dt$$

Exercice 3 :

Let F be the function defined by:

$$F(x) = \int_1^{x} \frac{\ln(1+t^2)}{t^2} dt$$

- Calculate (x).
- Deduce that the integral is convergent and determine its value.

$$I = \int_1^{+\infty} \frac{\ln(1+t^2)}{t^2} dt$$