

# Institut Universitaire des Sciences - IUS

## Faculté des Sciences et Technologie - FST

### Rapport du Td1 Mathématiques

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Soumis au chargé de cours Ismael ST-AMOUR

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### Installation de Jupyter notebook

```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PowerShell

PS C:\Users\dreack> F:\vnu> pip install jupyterlab
Requirement already satisfied: jupyterlab in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (4.4.0)
Requirement already satisfied: anyio<4.0 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyterlab) (2.0.0)
Requirement already satisfied: httpx>0.25.0 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyterlab) (0.28.1)
Requirement already satisfied: jinja2>=3.0.3 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyterlab) (2.11.0)
Requirement already satisfied: jupyter-core in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyterlab) (5.7.2)
Requirement already satisfied: jupyter-lsp>=2.0.0 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyterlab) (2.2.0)
Requirement already satisfied: jupyter-server>=2.4.0 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyterlab) (2.15.0)
Requirement already satisfied: jupyterlab-server>=2.27.1 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyterlab) (2.27.1)
Requirement already satisfied: notebook-shim>=0.2 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyterlab) (0.2.0)
Requirement already satisfied: packaging in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyterlab) (24.2)
Requirement already satisfied: setuptools>=41.1.0 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyterlab) (78.1.0)
```

```
Microsoft Windows [Version 10.0.22621.5109]
(c) Microsoft Corporation. All rights reserved.

C:\Users\dreack> F:\vnu> pip install notebook
Requirement already satisfied: notebook in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (7.0.4)
Requirement already satisfied: jupyter-server>=2.0.0 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from notebook) (2.15.0)
Requirement already satisfied: jupyterlab-server>=2.27.1 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from notebook) (2.27.1)
Requirement already satisfied: jupyterlab>4.5, <4.4.0rc0 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from notebook) (0.0.0)
Requirement already satisfied: notebook-shim>=0.2 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from notebook) (0.2.0)
Requirement already satisfied: tornado>=6.2.0 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from notebook) (6.4.0)
Requirement already satisfied: argon2-cffi>=21.1 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyter-server>=2.0.0->notebook) (29.1.0)
Requirement already satisfied: httpx>0.25.0 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyter-server>=2.0.0->notebook) (2.1.0)
Requirement already satisfied: jupyter-client>=7.4.4 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyter-server>=2.0.0->notebook) (8.0.2)
Requirement already satisfied: jupyter-core>=5.0, <=4.12 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyter-server>=2.0.0->notebook) (5.7.2)
Requirement already satisfied: jupyter-events>=0.11.0 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyter-server>=2.0.0->notebook) (0.13.0)
Requirement already satisfied: jupyter-server-terminals>=0.4.6 in c:\users\dreack\venv\appdata\local\programs\python\python313\lib\site-packages (from jupyter-server>=2.0.0->notebook) (0.5.2)
```

```

]
Requirement already satisfied: arrow==0.15.0 in c:\users\dreacke\appdata\local\program\python\python311\lib\site-packages (from ipedschema[format-mssql]>=4.10.0->jupyter-events<=8.11.0->jupyter-server<=2.0.0->notebook) (1.3.0)
Requirement already satisfied: websocket==1.2.0 in c:\users\dreacke\appdata\local\program\python\python311\lib\site-packages (from stack-data==7.23.1->ipykernel==6.5.0->jupyterlab==4.5.0+4.8.0rc0->notebook) (2.2.0)
Requirement already satisfied: ipedschema[format-mssql]>=4.10.0 in c:\users\dreacke\appdata\local\program\python\python311\lib\site-packages (from stack-data==7.23.1->ipykernel==6.5.0->jupyterlab==4.5.0+4.8.0rc0->notebook) (1.0.0)
Requirement already satisfied: parse-eval in c:\users\dreacke\appdata\local\program\python\python311\lib\site-packages (from stack-data==7.23.1->ipykernel==6.5.0->jupyterlab==4.5.0+4.8.0rc0->notebook) (0.2.1)
Requirement already satisfied: types-python-dateutil==2.8.10 in c:\users\dreacke\appdata\local\program\python\python311\lib\site-packages (from arrow==0.15.0->ipedschema[format-mssql]>=4.10.0->jupyter-events<=8.11.0->jupyter-server<=2.0.0->notebook) (2.8.10.20241206)

[notice] A new release of pip is available: 23.0.1 -> 23.1.1
[notice] To update, run: python.exe -m pip install --upgrade pip

C:\Users\dreacke\F\Work\python>python.exe -m pip install --upgrade pip
Requirement already satisfied: pip in c:\users\dreacke\appdata\local\program\python\python311\lib\site-packages (23.0.1)
Collecting pip
  Downloading pip-23.1.1-py3-none-any.whl.metadata (3.6 kB)
  Downloading pip-23.1.1-py3-none-any.whl (1.9 MB)
    1.0/1.9 MB [00:01:46<] eta 0:00:00
Installing collected packages: pip
  Attempting uninstall: pip
    Found existing installation: pip 23.0.1
    Uninstalling pip-23.0.1:
      Successfully uninstalled pip-23.0.1

```

Ecrire un programme qui convertit un nombre decimal en hexadecimal en demandant à l'utilisateur de saisir ce nombre

```

# Conversion d'un nombre décimal en hexadécimal
decimal = int(input("Entrer un nombre décimal"))
hexad = hex(decimal)
print(f"{decimal} en hexadécimal est {hexad[2:].upper()}")

```

Entrer un nombre décimal 340

340 en hexadécimal est 154

Ecrire un programme qui convertit un nombre hexadecimal en decimal en demandant à l'utilisateur de saisir ce nombre

```

hexad = input("Entrer une valeur hexadécimal")
decimal = int(hexad, 16)
print(f"{hexad} en décimal est {decimal}")

```

Entrer une valeur hexadécimal 3A

3A en décimal est 58

Créer un fichier CSV dans Python, charger le et l'afficher

```

import pandas as pd
# Exemple de données
data = {
    "Nom": ["Alice", "Bob", "Charlie", "David", "Eve"],
    "Âge": [25, 30, 35, 40, 28],
    "Ville": ["Paris", "London", "New York", "Tokyo", "San Francisco"]
}
# Créer un DataFrame

```

```
df = pd.DataFrame(data)
# Enregistrer le fichier CSV
df.to_csv("personnes.csv", index=False)
print("Fichier CSV créé avec succès !")
```

Fichier CSV créé avec succès !

```
df = pd.read_csv("personnes.csv")
print(df.head())
```

	Nom	Âge	Ville
0	Alice	25	Paris
1	Bob	30	London
2	Charlie	35	New York
3	David	40	Tokyo
4	Eve	28	San Francisco

Code pour générer (5000+lignes) lignes aléatoires

```
import pandas as pd
import numpy as np
from faker import Faker
fake = Faker() # Générateur de données aléatoires
# Nombre de lignes à générer
n = 5000
# Générer des données aléatoires
data = {
    'ID': np.arange(1, n+1), # ID de 1 à 5000
    'Nom': [fake.name() for _ in range(n)], # Noms aléatoires
    'Âge': np.random.randint(18, 60, size=n), # Âge entre 18 et 60 ans
    'Ville': [fake.city() for _ in range(n)], # Villes aléatoires
    'Email': [fake.email() for _ in range(n)], # Emails aléatoires
    'Date Inscription': [fake.date_this_decade() for _ in range(n)] # Dates d'inscription
}
# Convertir en DataFrame Pandas
df = pd.DataFrame(data)
# Enregistrer dans un fichier Excel
df.to_excel('grande_base_de_donnees.xlsx', index=False, engine='openpyxl')
print("Fichier Excel de 5000 entrées généré avec succès !")
```

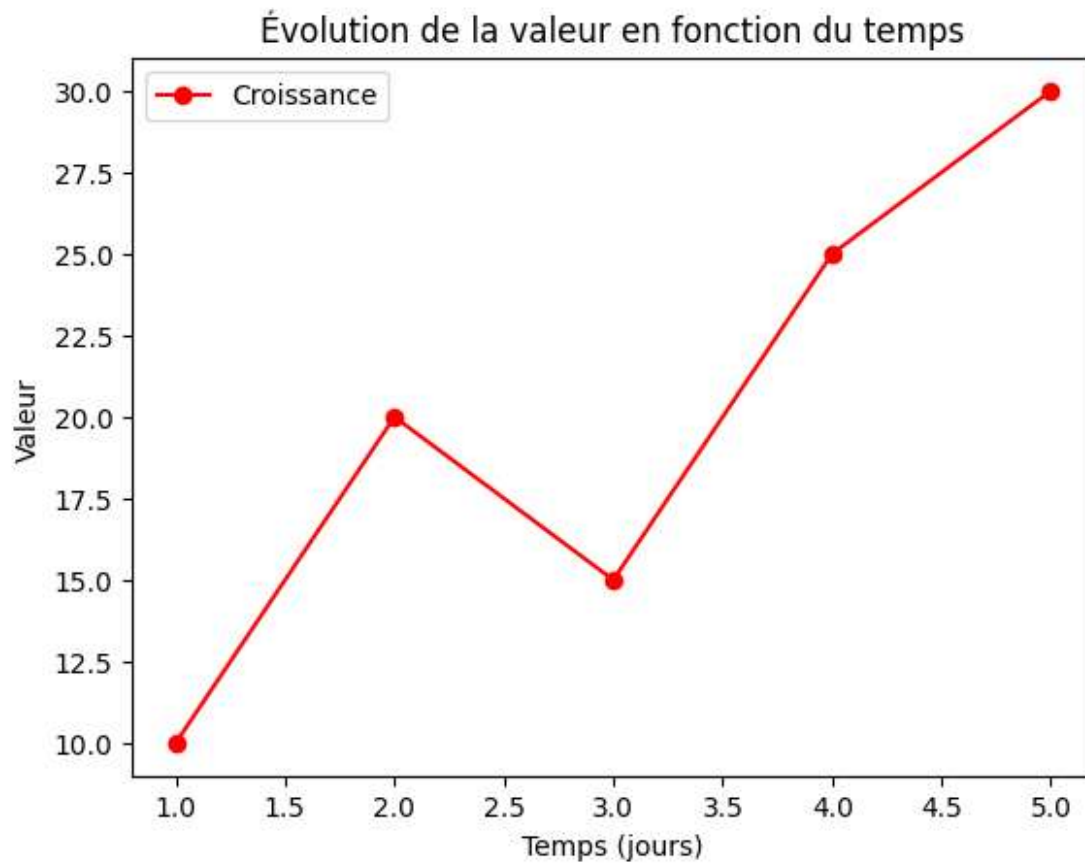
Fichier Excel de 5000 entrées généré avec succès !

Créer 3 graphes

Graphe 1

```
import matplotlib.pyplot as plt
# Données
x = [1, 2, 3, 4, 5]
y = [10, 20, 15, 25, 30]
plt.plot(x, y, marker='o', linestyle='-', color='r', label="Croissance")
```

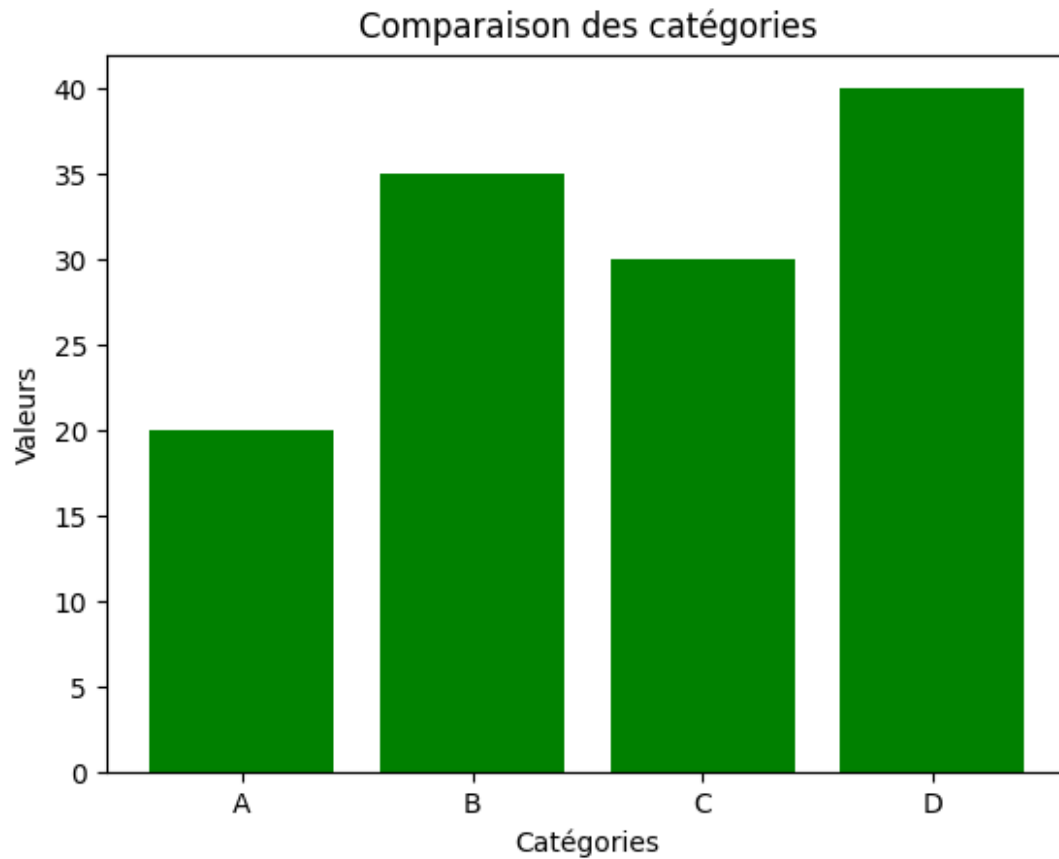
```
plt.xlabel("Temps (jours)")
plt.ylabel("Valeur")
plt.title("Évolution de la valeur en fonction du temps")
plt.legend()
plt.show()
```



*png*

Graphe 2

```
categories = ["A", "B", "C", "D"]
valeurs = [20, 35, 30, 40]
plt.bar(categories, valeurs, color='green')
plt.xlabel("Catégories")
plt.ylabel("Valeurs")
plt.title("Comparaison des catégories")
plt.show()
```



*png*

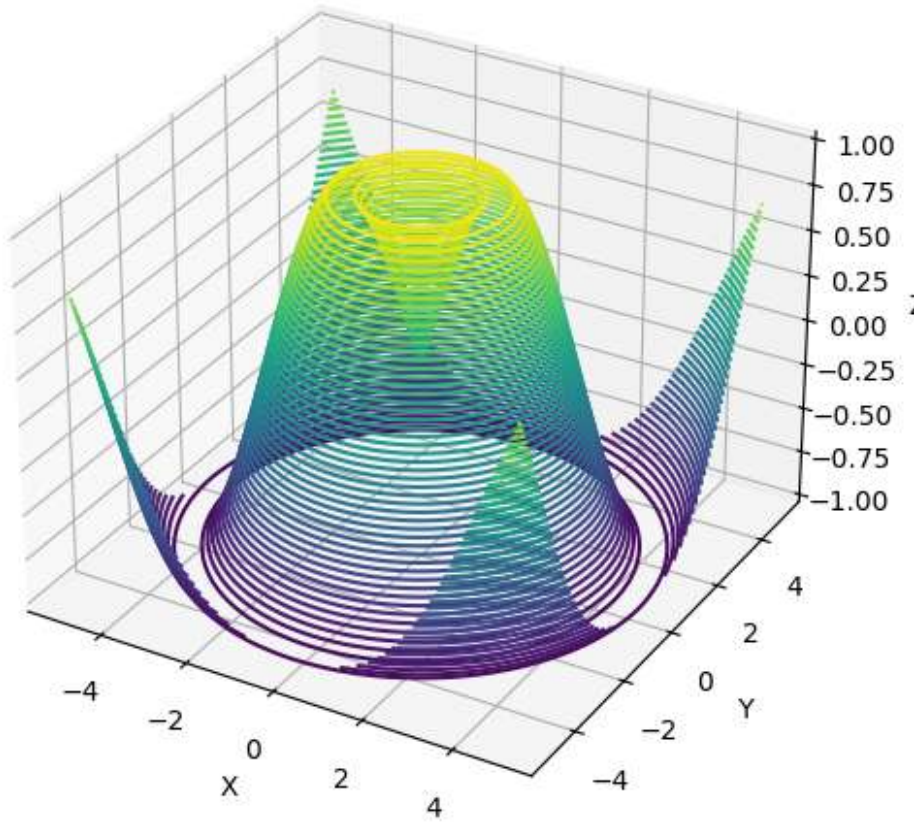
### Graphes 3

```
import matplotlib.pyplot as plt
import numpy as np
from mpl_toolkits.mplot3d import Axes3D
# Générer une grille pour X et Y
x = np.linspace(-5, 5, 100)
y = np.linspace(-5, 5, 100)
X, Y = np.meshgrid(x, y)
# Définir la fonction Z (par exemple, une surface sinusoidale)

Z = np.sin(np.sqrt(X**2 + Y**2))
# Créer la figure et le subplot 3D
fig = plt.figure(figsize=(8, 6))
ax = fig.add_subplot(111, projection='3d')
# Tracer les contours 3D
ax.contour3D(X, Y, Z, 50, cmap='viridis')
# Ajouter des labels et titre
ax.set_xlabel("X")
ax.set_ylabel("Y")
ax.set_zlabel("Z")
```

```
ax.set_title("Contours 3D de la fonction  $Z = \sin(\sqrt{X^2 + Y^2})$ ")  
plt.show()
```

Contours 3D de la fonction  $Z = \sin(\sqrt{X^2 + Y^2})$



*png*