Distribuição Multivariada Contínua

Nota 0,5

Importar bibliotecas

```
import numpy as np
import matplotlib.pyplot as plt
from scipy.stats import multivariate_normal
```

Formativa

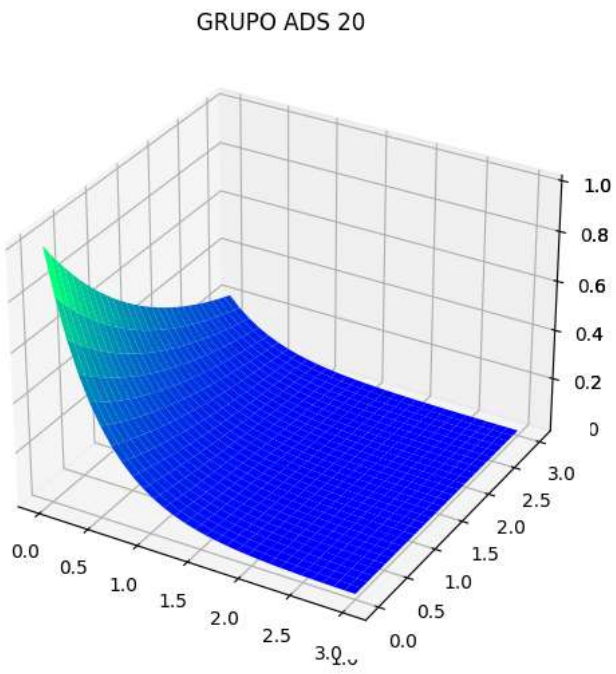
Questão 1

Plotar função

- $f_{X,Y}(x,y) = e^{-\frac{(4x+y)}{2}}$
- Usar a mesma grade de dados do exemplo 1
- Colocar nome do grupo no título do gráfico

```
def f(x, y):
    return np.exp(-(4*x+y)/2)

fig = plt.figure(figsize=(6, 6))
ax = plt.axes(projection="3d")


x = np.linspace(0, 3, 30)
y = np.linspace(0, 3, 30)
X, Y = np.meshgrid(x, y)
Z = f(X, Y)

ax.set_xlabel('x')
ax.set_ylabel('y')
ax.set_zlabel('z')

ax = plt.axes(projection='3d')
ax.plot_surface(X, Y, Z, rstride=1, cstride=1,
                cmap='winter', edgecolor='none')
ax.set_title('GRUPO ADS 20');          # Coloque seu código aqui

plt.show()
```

correto



Questão 2

- Ler o arquivo DadosDatacenter.csv com Numpy (ver notebook aula)
- Calcular e imprimir a matriz de covariância SIGMA (ver notebook aula)
- Calcular o vetor de médias MU (dica: MU = DadosDataCenter.mean(axis=0)
- Definir a função Gaussiana multivariada (ver notebook aula)
- Calcular e imprimir os valores da pdf para os valores em DadosDataCenter (dica: nmv.pdf(DadosDataCenter)

```
# Conectar com Google Drive
from google.colab import drive
drive.mount('/content/gdrive')
```

```
Mounted at /content/gdrive
```

```
from google.colab import drive
drive.mount('/content/drive')
```

```
Mounted at /content/drive
```

```
# Leitura de dados com Numpy
DadosDataCenter = np.loadtxt('/content/gdrive/MyDrive/Faculdade/8 Periodo/Analise de Desempeho de Sistemas/DADOS/DadosDataCenter.csv', de

# Calcular a matriz de covariância SIGMA com numpy e imprimir
# Dica: usar np.cov(...)
# O argumento é a transposta de DadosDataCenter
sigma = np.cov(DadosDataCenter.T)
print(f'Sigma: {sigma}')

# Calcular vetor de médias MU com numpy e imprimir
# Dica: Usar DadosDatacenter.mean(axis=0)
mu = DadosDataCenter.mean(axis = 0)
print(f'MU: {mu}')

# Definir a função Gaussiana multivariada
# Dica: usar nmv = multivariate_normal()
# Os argumentos são MU e SIGMA
nmv = multivariate_normal(mu, sigma)

# Calcular e imprimir os valores da pdf para os valores em DadosDataCenter
# Dica: usar nmv.pdf(...)
print('Valores da pdf')
print(nmv.pdf(DadosDataCenter))
```

correto

```
Sigma: [[ 8.95634081e+01 -5.03966114e+00  1.52015637e+00  3.51915201e-01]
 [-5.03966114e+00  1.37298158e+00  4.63601104e-01  4.20892797e-02]
 [ 1.52015637e+00  4.63601104e-01  7.14127859e+00  3.85457111e-01]
 [ 3.51915201e-01  4.20892797e-02  3.85457111e-01  3.09498140e-02]]
MU: [25.30344692  4.57110221  7.80435402  0.70298185]
Valores da pdf
[4.01026677e-04 1.55554379e-03 9.85261623e-04 1.31395139e-03
 6.08539149e-03 1.61929667e-03 5.83772752e-03 9.94729922e-05
 7.39722835e-03 7.73624567e-03 4.82979172e-03 2.59769060e-03
 9.50067660e-03 1.87933036e-03 8.00526231e-03 3.99674104e-04
 5.50487711e-04 3.45126484e-03 1.84324337e-05 2.22767887e-04
 3.66711928e-03 4.87167240e-03 9.01858124e-03 1.69429266e-03
 6.20221833e-03 2.76742065e-03 2.55088775e-03 2.03462596e-05
 4.22343729e-03 2.45963086e-04 9.26327692e-03 2.95501834e-03
 5.22471598e-03 7.16172058e-04 2.65663060e-03 2.47668893e-03
 7.16214920e-03 4.15989143e-04 1.79572018e-04 3.16464585e-03
 2.91188337e-03 1.29353859e-03 6.61891604e-05 2.37602156e-04
 4.12803681e-03 6.80295580e-03 4.02139770e-03 2.34560943e-03
 7.49042243e-03 5.49688632e-03 1.97706570e-05 5.92066679e-03
 2.78856409e-03 2.75788529e-03 7.33516135e-03 1.64471387e-03
 2.94572459e-03 3.44720183e-03 1.76287248e-03 2.61689726e-05
 5.78215365e-06 3.25418179e-03 3.63744820e-03 7.96910516e-03
 6.68224720e-03 3.70420677e-03 6.42050021e-03 2.62769122e-03
 8.10926684e-03 1.28314496e-04 1.16152077e-04 1.53601188e-04
 1.04330830e-03 3.68867637e-03 9.85387911e-04 8.44806783e-03
 4.64240380e-03 4.92162706e-03 8.09405510e-03 4.49243322e-03
 7.57860803e-05 4.13715374e-04 8.02604794e-04 6.80762172e-03
 6.27592052e-03 7.06210928e-03 6.51217965e-04 3.55204781e-05
 2.37919082e-05 1.50568633e-03 8.63563889e-03 1.99308624e-03
 4.93319934e-04 4.75928731e-03 9.52559440e-03 7.83858353e-04
 8.74712244e-03 9.28594808e-04 1.12574805e-04 5.41895007e-04]
```

Comece a programar ou gere código com IA.