**7-тажриба иши**

**ЎҚУВ ЖАРАЕНИНИ СТАТИСТИК ТАҲЛИЛ ҚИЛИШ. ГУРУҲ РЕЙТИНГИНИ ТАҲЛИЛИ**

Masalani-qo’yilishi:Sinfdagi talabalarni nechchi bahoga o’qishini statistikasi,talabalar taqsimoti grafikda hisoblash sinfda 30 ta talaba mavjud.

import numpy as np

import matplotlib.pyplot as plt

# 30 talabaga tasodifiy baho beramiz (0 dan 1 gacha)

np.random.seed(42)

student\_scores = np.random.rand(30)

# Trapetsiya funksiyasini aniqlash

def trapezoidal(x, a, b, c, d):

    left\_slope = (x - a) / (b - a) if b != a else 0

    right\_slope = (d - x) / (d - c) if d != c else 0

    return np.maximum(0, np.minimum(np.minimum(left\_slope, 1), right\_slope))

# Baho toifalari

categories = {

    "Umuman qoniqarsiz": (0.0, 0.0, 0.1, 0.2),

    "Qoniqarsiz": (0.1, 0.2, 0.3, 0.4),

    "Qoniqarli": (0.3, 0.4, 0.5, 0.6),

    "Yaxshi": (0.5, 0.6, 0.7, 0.8),

    "A'lo": (0.7, 0.8, 0.9, 1.0)

}

# Ranglar va grafik chizish

colors = ['orange', 'darkorange', 'red', 'magenta', 'blue']

plt.figure(figsize=(10, 5))

# Har bir kategoriya bo'yicha talabalar sonini hisoblash

grade\_counts = {category: 0 for category in categories}

x = np.linspace(0, 1, 100)

# Kategoriyalar bo‘yicha grafikni chizamiz

for (category, (a, b, c, d)), color in zip(categories.items(), colors):

    y = np.array([trapezoidal(val, a, b, c, d) for val in x])

    plt.plot(x, y, color=color, label=category)

    plt.fill\_between(x, y, color=color, alpha=0.2)

# Talabalarni kategoriyalarga ajratish

for score in student\_scores:

    max\_membership = -1

    best\_category = None

    for category, (a, b, c, d) in categories.items():

        membership = trapezoidal(score, a, b, c, d)

        if membership > max\_membership:

            max\_membership = membership

            best\_category = category

    # Agar best\_category hali aniqlanmagan bo'lsa, eng yaqin kategoriya tanlanadi

    if best\_category is None:

        best\_category = min(categories.keys(), key=lambda k: abs(score - np.mean(categories[k])))

    grade\_counts[best\_category] += 1

# Grafik bezaklari

plt.xlabel("Normallashtirilgan baho")

plt.ylabel("A'zolik darajasi")

plt.title("Talabalar baholarining trapetsiya taqsimoti")

plt.legend()

plt.grid(True, linestyle="--", alpha=0.6)

# Talabalar taqsimotini chiqarish

print("Talabalar baholari taqsimoti:")

for grade, count in grade\_counts.items():

    print(f"{grade}: {count} ta talaba")

# Grafikni ko‘rsatish

plt.show()

