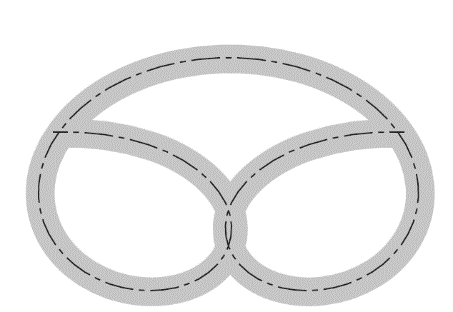
1. funksiyaning -π ≤ *x* ≤ π va -π ≤ *y* ≤ π sohalardagi 3D sirt grafigini tuzing. **(10 ball)**
2. Rasmda ko'rsatilgan tuzli krendel (pishiriq nomi) shakli quyidagi parametrik tenglamalar bilan berilgan:

Bu yerda -4 ≤ t ≤ 4. Y o'qi diapazonini -1 dan 3 gacha va x o’qinikini -3 dan 3 gacha o’rnating. Krendel grafikini tuzing. O’qlarni belgilang va grafikga sarlavha bering. **(10 ball)**

1. N yil davomida umumiy F summasini to'plash uchun yillik foiz stavkasi r bo'lgan hisobvaraqqa o'tkazilishi kerak bo'lgan depozit hisobvarag'iga oylik P omonatini quyidagi formula yordamida hisoblash mumkin:

Yillik foiz stavkasi 4,85% bo'lsa, 10, 11, 12, 13, 14 va 15 yil davomida 200 000 dollarni to'plash uchun oylik omonat miqdorini hisoblang. Natijalarni ikkita ustunli jadvalda ko'rsating, bu erda birinchi ustun yillar soni, ikkinchi ustun oylik omonat hisoblanadi. **(10 ball)**

1. 3×3 matritsaning determinantini quyidagi formula yordamida hisoblaydigan maxsus MATLAB funksiyasini yozing:

Funksiya nomi va argumentlari uchun **d3 = det3by3(A)** dan foydalaning, bu yerda kirish argumenti **A** - 3×3 matritsa, chiqish argumenti **d3** – determinant qiymati. **det3by3** ning kodini shunday yozingki, ichida 2×2 matritsaning determinatini hisoblaydigan funksiyadan foydalansin. () Quyidagi matritsalarning determinantini topish uchun **det3by3** funksiyadan foydalaning: **(15 ball)**:

1. *ax2 + bx + c = 0* kvadrat tenglamaning haqiqiy ildizlarini aniqlaydigan dasturni script faylida yozing. Uning ishlashi davomida fayl foydalanuvchidan *a, b* va *c* konstantalarining qiymatlarini kiritishni taklif qilishi kerak. Tenglamaning ildizlarini hisoblash uchun dastur quyidagi formula yordamida diskriminant *D* ni hisoblab chiqadi:

Agar D > 0, bo'lsa, u holda dasturda "Tenglama ikkita ildizga ega" xabarlari paydo bo'ladi va keyingi qatorda ekranda ildizlar ko'rsatiladi.

Agar D = 0, bo'lsa, u holda dastur "Tenglama bitta ildizga ega" xabarlarini ko'rsatadi va ildiz keyingi qatorda ko'rsatiladi.

Agar D < 0, bo'lsa, u holda dastur "Tenglamaning ildizlari yo'q" xabarlarini ko'rsatadi.

Quyidagi uchta tenglamaning yechimini olish uchun ushbu skript faylini buyruqlar oynasida uch marta ishga tushiring: **(25 ball)**

a) 3x2 + 6x + 3 = 0 b) -3x2 + 4x – 6 = 0

**1-savol  
  
% Problem: Plot the 3D surface of the function z = cos(0.7x + 0.7y) \* cos(0.7x - 0.7y)**

**% for -pi <= x <= pi and -pi <= y <= pi.**

**% Define the range of x values from -pi to pi.**

**% We'll use 'linspace' to create a set of evenly spaced points.**

**% Let's use 50 points for a reasonably smooth surface.**

**x = linspace(-pi, pi, 50);**

**% Define the range of y values from -pi to pi (same as x in this case).**

**y = linspace(-pi, pi, 50);**

**% Now, we need to create a grid of (x, y) points.**

**% 'meshgrid' takes the x and y vectors and returns 2D arrays X and Y.**

**[X, Y] = meshgrid(x, y);**

**% Each row of X corresponds to a y value, and each column of Y corresponds to an x value.**

**% Calculate the corresponding z values for each (x, y) point using the given function:**

**% z = cos(0.7x + 0.7y) \* cos(0.7x - 0.7y)**

**% We use element-wise multiplication and operations ('.\*', '.\*') because X and Y are arrays.**

**Z = cos(0.7\*X + 0.7\*Y) .\* cos(0.7\*X - 0.7\*Y);**

**% Now, we can create the 3D surface plot using the 'surf' function.**

**% 'surf(X, Y, Z)' takes the x, y, and z values at each point to draw the surface.**

**surf(X, Y, Z);**

**% Let's add labels to the x, y, and z axes so we know what they represent.**

**xlabel('x');**

**ylabel('y');**

**zlabel('z');**

**% Add a title to the plot to describe what it shows.**

**title('3D Surface Plot of z = cos(0.7x + 0.7y) \* cos(0.7x - 0.7y)');**

**% We can also add a colorbar to the side of the plot.**

**% The colorbar shows the mapping of z-values to colors on the surface.**

**colorbar;**

**% Optional: You can add a grid to the plot for better visualization.**

**grid on;**

**2-savol**

**t = linspace(-4, 4, 100);**

**% Now, we calculate the x and y coordinates for each value of 't' using the given equations.**

**x = (3.3 - 0.4 \* t.^2) .\* sin(t);**

**y = (2.5 - 0.3 \* t.^2) .\* cos(t);**

**% We use '.\*' for element-wise multiplication and '.^' for element-wise power.**

**% Create a new figure window to show the plot.**

**figure;**

**% Use the 'plot' function to plot y versus x.**

**plot(x, y);**

**% Set the range for the x-axis from -3 to 3.**

**xlim([-3 3]);**

**% Set the range for the y-axis from -1 to 3.**

**ylim([-1 3]);**

**% Add a label to the x-axis.**

**xlabel('x');**

**% Add a label to the y-axis.**

**ylabel('y');**

**% Add a title to the plot.**

**title('Pretzel Shape');**

**% Optional: Add a grid to the plot for better visualization.**

**grid on;**

**3-savol**

**F = 200000;**

**r = 0.0485;**

**years = 10:15;**

**disp('-----------------------------------');**

**disp(' Number of Years | Monthly Deposit ($) ');**

**disp('-----------------------------------');**

**for N = years**

**monthly\_rate = r / 12;**

**number\_of\_periods = 12 \* N;**

**P = F \* monthly\_rate / ((1 + monthly\_rate)^number\_of\_periods - 1);**

**fprintf(' %2d | $%10.2f \n', N, P);**

**end**

**disp('-----------------------------------');**

**4-savol**

**function d2 = det2by2(M)**

**d2 = M(1,1) \* M(2,2) - M(1,2) \* M(2,1);**

**end**

**function d3 = det3by3(A)**

**a11 = A(1,1);**

**a12 = A(1,2);**

**a13 = A(1,3);**

**a21 = A(2,1);**

**a22 = A(2,2);**

**a23 = A(2,3);**

**a31 = A(3,1);**

**a32 = A(3,2);**

**a33 = A(3,3);**

**sub\_matrix\_1 = [a22 a23; a32 a33];**

**det\_sub\_1 = det2by2(sub\_matrix\_1);**

**sub\_matrix\_2 = [a21 a23; a31 a33];**

**det\_sub\_2 = det2by2(sub\_matrix\_2);**

**sub\_matrix\_3 = [a21 a22; a31 a32];**

**det\_sub\_3 = det2by2(sub\_matrix\_3);**

**d3 = a11 \* det\_sub\_1 - a12 \* det\_sub\_2 + a13 \* det\_sub\_3;**

**end**

**A = [1 3 2; 6 5 4; 7 8 9];**

**determinant\_A = det3by3(A);**

**fprintf('Determinant of matrix A:\n');**

**disp(A);**

**fprintf('is: %f\n\n', determinant\_A);**

**B = [-2.5 7 1; 5 -3 -2.6; 4 2 -1];**

**determinant\_B = det3by3(B);**

**fprintf('Determinant of matrix B:\n');**

**disp(B);**

**fprintf('is: %f\n', determinant\_B);**

**5-savol**

**% Script to find the real roots of a quadratic equation ax^2 + bx + c = 0**

**% Prompt the user to enter the coefficients**

**a = input('Enter the coefficient a: ');**

**b = input('Enter the coefficient b: ');**

**c = input('Enter the coefficient c: ');**

**% Calculate the discriminant**

**D = b^2 - 4\*a\*c;**

**% Check the value of the discriminant**

**if D > 0**

**% Two distinct real roots**

**x1 = (-b + sqrt(D)) / (2\*a);**

**x2 = (-b - sqrt(D)) / (2\*a);**

**disp('Tenglama ikkita ildizga ega:'); % The equation has two roots**

**fprintf('Ildiz 1: %f\n', x1); % Root 1**

**fprintf('Ildiz 2: %f\n', x2); % Root 2**

**elseif D == 0**

**% One real root (repeated)**

**x = -b / (2\*a);**

**disp('Tenglama bitta ildizga ega:'); % The equation has one root**

**fprintf('Ildiz: %f\n', x); % Root**

**else**

**% No real roots**

**disp('Tenglamaning ildizlari yo''q.'); % The equation has no real roots**

**end**