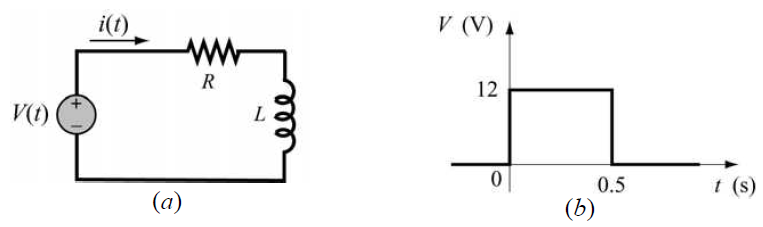
1. funksiyaning -4 ≤ *x* ≤ 4 va -3 ≤ *y* ≤ 3 sohalardagi 3D sirt grafigini tuzing. **(10 ball)**
2. R = 4 Om qarshilik va L = 1.3 H induktor (a) rasmda ko’rsatilgandek kuchlanish manbai bo’lgan zanjirga ulangan (RL zanjiri).



Kuchlanishi manbai (b) rasmda ko’rsatilgandek V = 12 V va 0.5 sek davomida to’g’ri burchakli impuls kuchlanishini berganda, zanjirdagi tok i(t) vaqt funksiysi sifatida quyidagi formulalar bilan beriladi:

0 ≤ *t* ≤ 2 sek. uchun vaqt funksiyasi sifatida tokning grafigini 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 4,35% bo'lsa, 5, 6, 7, 8, 9 va 10 yil davomida 100 000 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. Odamning tana yog' ulushi (BFP - body fat percentage) formula bo'yicha baholanishi mumkin:

bunda *BMI* – tana massa indeksi, formula bilan topiladi, bunda *W* – tana vazni funtlarda va *H* – tana bo’yi dyuymlarda, Age – odam yoshi, *Gender* = 1 erkaklar uchun va *Gender* = 0 ayollar uchun.

Tana yog’ ulushini (BFP) hisoblaydigan maxsus funksiyani yozing. Funksiya nomi va argumentlari uchun **BFP = BodyFat(w, h, age, gen)** dan foydalaning. Kirish argumentlari mos ravishda vazn, bo’y, yosh va jins (erkaklar uchun 1, ayollar uchun 0). Chiqish argumenti esa BFP. Quyida berilgan odamlarning tana yog’ ulushini hisoblash uchun funksiyadan foydalaning: **(15 ball)**:

а) 35-yoshli erkak, bo’yi 74 dyuym, vazni 220 funt.

1. 22-yoshli ayol, bo’yi 67 dyuym, vazni 135 funt.
2. *π* ning qiymatini quyidagi ifoda bilan baholash mumkin:

Ushbu ifodani (birinchi n ta hadning yig'indisi orqali) baholovchi dasturni (sikl yordamida) yozing. Dasturni n = 100, n = 10000 va n = 1000000 uchun ishga tushiring, Natijani ***pi*** buyrug’I bilan solishtiring. (***format long*** dan foydalaning) **(25 ball)**

**1-savol**

**Second code:**

**[x, y] = meshgrid(-4:0.1:4, -3:0.1:3);**

**z = (x.^2)/4 - 2\*(sin(0.7\*y)).^2;**

**surf(x, y, z);**

**xlabel('x'); ylabel('y'); zlabel('Z');**

**title('Z = x^2/4 - 2sin^2(0.7y)');**

**% We use the 'linspace' function to create vectors of evenly spaced points**

**% for x and y within the specified ranges. We choose a number of points (e.g., 50)**

**% to create a sufficiently smooth surface.**

**x = linspace(-4, 4, 50);**

**y = linspace(-3, 3, 50);**

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

**% These arrays represent the coordinates of a grid in the xy-plane. Each row of X**

**% contains the same x-value, and each column of Y contains the same y-value.**

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

**% 2. Calculate the corresponding Z values:**

**% Now, we use the given function Z = x^2/4 - 2\*sin^2(0.7y) to calculate the Z-values**

**% for each point (x, y) in the grid defined by X and Y. MATLAB allows element-wise**

**% operations on matrices, so we can directly apply the formula.**

**Z = (X.^2) / 4 - 2 \* (sin(0.7 \* Y)).^2;**

**% 3. Use the 'surf' function to plot the surface:**

**% The 'surf' function takes the 2D arrays X, Y, and Z as input and creates a**

**% 3D surface plot. The color of the surface is determined by the values in Z.**

**figure; % Create a new figure window to display the plot**

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

**% 4. Add labels to the axes:**

**% The 'xlabel', 'ylabel', and 'zlabel' functions are used to add labels to the**

**% x, y, and z axes, respectively. This makes the plot easier to interpret.**

**xlabel('x');**

**ylabel('y');**

**zlabel('Z');**

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

**% The 'title' function adds a title to the plot, indicating the function that is being visualized.**

**title('3D Surface Plot of Z = x^2/4 - 2sin^2(0.7y)');**

**% Optional: Add a colorbar to show the mapping of Z-values to colors.**

**colorbar;**

**% Optional: Adjust the view of the 3D plot.**

**view(135, 30); % Sets the azimuth to 135 degrees and the elevation to 30 degrees.**

**% You can experiment with different values to find a suitable view.**

**% Optional: Enable grid lines for better visualization.**

**grid on;**

**2-savol**

**% Let's define the values given in the problem**

**R = 4; % Resistance (in Ohms)**

**L = 1.3; % Inductance (in Henrys)**

**V = 12; % Voltage (in Volts)**

**% We need to plot the current from time t = 0 to t = 2 seconds.**

**% Let's create a list of time points using 'linspace'.**

**% 'linspace(start, end, number\_of\_points)' gives us evenly spaced points.**

**t = linspace(0, 2, 100); % From 0 to 2 seconds, with 100 points in between**

**% We'll create an empty list to store the current values at each time point.**

**i = zeros(size(t)); % 'zeros(size(t))' makes a list of zeros with the same size as 't'**

**% Now, we need to calculate the current using the formulas given for different time periods.**

**% We'll use a 'for' loop to go through each time point in our list 't'.**

**for k = 1:length(t) % 'length(t)' gives us the number of time points**

**if t(k) <= 0.5 % For the time interval 0 <= t <= 0.5 seconds**

**% Apply the first formula: i(t) = (V/R) \* (1 - exp(-(R\*t)/L))**

**i(k) = (V/R) \* (1 - exp(-(R\*t(k))/L));**

**% 'exp()' is the function for the exponential (e to the power of something)**

**else % For the time interval t > 0.5 seconds**

**% Apply the second formula: i(t) = (V/R) \* exp(-(R\*(t-0.5))/L) \* (1 - exp(-(R\*0.5)/L))**

**i(k) = (V/R) \* exp(-(R\*(t(k)-0.5))/L) \* (1 - exp(-(R\*0.5)/L));**

**end**

**end**

**% Now that we have the current values for each time point, let's plot them.**

**% We use the 'plot' function with time 't' on the x-axis and current 'i' on the y-axis.**

**plot(t, i);**

**% Let's add labels to the axes so we know what we're plotting.**

**xlabel('Time (s)'); % Label for the horizontal axis (time in seconds)**

**ylabel('Current (A)'); % Label for the vertical axis (current in Amperes)**

**% And let's add a title to the plot.**

**title('Current in an RL Circuit with a Pulsed Voltage Source');**

**% Finally, let's add a grid to the plot to make it easier to read values (optional).**

**grid on;**

**3-savol**

**% Parameters**

**F = 100000; % Target amount**

**r = 4.35 / 100; % Annual interest rate (decimal)**

**years = 5:10; % Years to calculate for**

**% Display table header**

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

**disp(' Years | Monthly Deposit ');**

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

**% Calculate and display monthly deposit for each year**

**for N = years**

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

**periods = 12 \* N;**

**P = F \* monthly\_rate / ((1 + monthly\_rate)^periods - 1);**

**fprintf(' %2d | $%8.2f \n', N, P);**

**end**

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

**4-savol**

**% Formula for BFP: BFP = 1.2 \* BMI + 0.23 \* Age - 10.8 \* Gender - 0.54**

**% Formula for BMI: BMI = 703 \* W / H^2 (W = weight in pounds, H = height in inches)**

**% Gender: 1 for male, 0 for female**

**% -------------------- Function Definition --------------------**

**function bfp = BodyFat(w, h, age, gen)**

**% BodyFat: Calculates the Body Fat Percentage (BFP).**

**% bfp = BodyFat(w, h, age, gen) returns the BFP for a person**

**% with weight w (pounds), height h (inches), age (years), and**

**% gender gen (1 for male, 0 for female).**

**% Calculate Body Mass Index (BMI)**

**bmi = 703 \* w / (h^2);**

**% Calculate Body Fat Percentage (BFP) using the formula**

**bfp = 1.2 \* bmi + 0.23 \* age - 10.8 \* gen - 0.54;**

**end**

**% -------------------- End of Function Definition --------------------**

**% Now, let's use this function to calculate the BFP for the two individuals.**

**% a) 35-year-old male, height 74 inches, weight 220 pounds.**

**weight\_a = 220; % pounds**

**height\_a = 74; % inches**

**age\_a = 35; % years**

**gender\_a = 1; % 1 for male**

**% Call the BodyFat function to calculate BFP for individual a**

**bfp\_a = BodyFat(weight\_a, height\_a, age\_a, gender\_a);**

**% Display the result for individual a**

**fprintf('a) 35-year-old male (74 inches, 220 pounds): BFP = %.2f%%\n', bfp\_a);**

**% b) 22-year-old female, height 67 inches, weight 135 pounds.**

**weight\_b = 135; % pounds**

**height\_b = 67; % inches**

**age\_b = 22; % years**

**gender\_b = 0; % 0 for female**

**% Call the BodyFat function to calculate BFP for individual b**

**bfp\_b = BodyFat(weight\_b, height\_b, age\_b, gender\_b);**

**% Display the result for individual b**

**fprintf('b) 22-year-old female (67 inches, 135 pounds): BFP = %.2f%%\n', bfp\_b);**

**5-savol**

**% Problem: Estimate the value of pi using the formula: pi ≈ sqrt(6 \* sum(1/n^2))**

**% Set the output format to long for higher precision**

**format long;**

**% Values of n for which to estimate pi**

**n\_values = [100, 10000, 1000000];**

**% Loop through each value of n**

**for n = n\_values**

**% Initialize the sum to zero**

**series\_sum = 0;**

**% Calculate the sum of the first n terms of the series**

**for i = 1:n**

**series\_sum = series\_sum + 1/(i^2);**

**end**

**% Estimate pi using the formula**

**pi\_estimated = sqrt(6 \* series\_sum);**

**% Get the built-in value of pi for comparison**

**pi\_actual = pi;**

**% Calculate the difference between the estimated and actual value of pi**

**difference = abs(pi\_estimated - pi\_actual);**

**% Display the results for the current value of n**

**fprintf('For n = %d:\n', n);**

**fprintf(' Estimated value of pi: %.15f\n', pi\_estimated);**

**fprintf(' Actual value of pi: %.15f\n', pi\_actual);**

**fprintf(' Difference: %.15f\n\n', difference);**

**end**