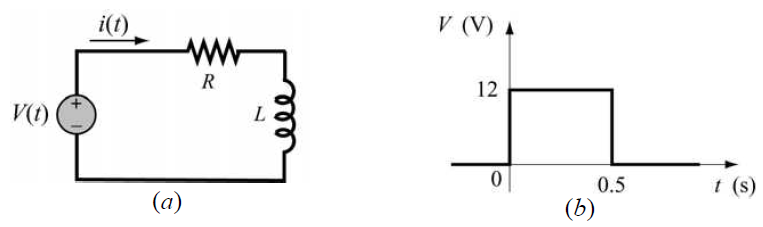
1. Harakatlanuvchi zarrachaning vaqt funksiyasi sifatidagi holati quyidagicha ifodalanadi:

0 ≤ t ≤ 30 uchun zarrachaning holatini chizing **(10 ball)**

1. 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 4,85% 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. Issiqlik indeksi *HI* (° Farangeytlarda) tuyuladigan harorat hisoblanadi. 80 °F dan yuqori harorat va 40% dan yuqori namlik uchun u quyidagi formula bo’yicha hisoblanadi:

bunda *T* – Farangeytdagi harorat, *R* – prosentlardagi nisbiy namlik, *C1* = -42.379, *C2* = 2.04901523, *C3* = 10.14333127, *C4* = -0.22475541, *C5* = -6.83783×10-3 *C6* = -5.481717×10-2 , *C7* = 1.22874×10-3 , *C8* = 8.5282×10-4 , va *C9* = -1.99×10-6. Berilgan T va R uchun issiqlik indeksi HI ni hisoblaydigan maxsus funksiyani yarating. Funksiya nomi va argumentlari uchun **HI=HeatIn(T, R)** dan foydalaning. Kirish argumentlari: **T** – harorat °F da va, **R** nisbiy nalik % larda, va Chiqish argumenti – **HI** issiqlik indeksi °F larda (eng yaqin butun songa yaxlitlangan). Quyidagi shartlar uchun issiqlik indeksini aniqlash uchun funksiyadan foydalaning **(15 ball)**:

1. T = 95 °F, R = 80 %.
2. T = 100 °F, R = 100 % (saunadagi holat)
3. Teskari Fibonachchi doimiysi *Fib* cheksiz yig'indi bilan aniqlanadi:

Bu yerda *Fn* – Fibonachchi ketma-ketligi 1, 1, 2, 3, 5, 8, 13, ... . Ushbu ketma-ketlikdagi har bir element oldingi ikkitasining yig'indisidir. Birinchi ikkita elementni 1 ga tenglashtirib, qolganlari uchun *Fn = Fn-1 + Fn-2* shu formula orqali topiladi. Berilgan ***n*** sonli hadlar uchun ***Fib*** ni hisoblaydigan skript faylida MATLAB dasturini yozing. n = 10, 50 va 100 uchun dasturni ishga tushiring. **(25 ball)**

1-savol

% Define the time range

t = linspace(0, 30, 500); % Use 500 points for a smooth curve

% Calculate the x, y, and z coordinates

x = (((t - 15).^2) + 1) / 100 .\* sin(3\*t);

y = (((t - 15).^2) + 1) / 100 .\* cos(3\*t);

z = 0.4 \* t.^(3/2) / 2;

% Create a new figure window

figure;

% Plot the trajectory in 3D

plot3(x, y, z);

% Add labels to the axes

xlabel('x');

ylabel('y');

zlabel('z');

% Add a title to the plot

title('Harakatlanuvchi zarrachaning holati');

% Add a grid for better visualization (optional)

grid on;

% Keep the aspect ratio consistent (optional)

axis equal;

2-savol

% Given parameters

R = 4; % Resistance in Ohms

L = 1.3; % Inductance in Henrys

V = 12; % Voltage in Volts

% Time vector from 0 to 2 seconds with a small step for smooth plotting

t = linspace(0, 2, 500);

% Initialize the current vector

i = zeros(size(t));

% Calculate the current for each time point

for index = 1:length(t)

if t(index) >= 0 && t(index) <= 0.5

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

elseif t(index) > 0.5

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

end

end

% Create a new figure window

figure;

% Plot the current as a function of time

plot(t, i);

% Add labels to the axes

xlabel('t (s)');

ylabel('i (A)');

% Add a title to the plot

title('Current in RL Circuit');

% Add a grid for better visualization

grid on;

3-savol

% Given values

F = 200000; % Future value ($)

r\_annual = 4.85; % Annual interest rate (%)

r = r\_annual / 100; % Annual interest rate (decimal)

years = 10:15; % Number of years

% Display header for the table

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

disp(' Years | Monthly Deposit ');

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

% Calculate and display the monthly deposit for each year

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 | $%8.2f \n', N, P);

end

% Display footer for the table

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

4-savol

function HI = HI\_HeatIn(T, R)

% HI\_HeatIn: Calculates the Heat Index (HI) in Fahrenheit.

% HI = HI\_HeatIn(T, R) returns the heat index for a given

% temperature (T in Fahrenheit) and relative humidity (R in percent).

% Constants from the formula

C1 = -42.379;

C2 = 2.04901523;

C3 = 10.14333127;

C4 = -0.22475541;

C5 = -6.83783e-3;

C6 = 5.481717e-2;

C7 = 1.22874e-3;

C8 = 8.5282e-4;

C9 = -1.99e-6;

% Calculate the Heat Index using the formula

HI = C1 + (C2 \* T) + (C3 \* R) + (C4 \* T \* R) + (C5 \* T^2) + (C6 \* R^2) + ...

(C7 \* T^2 \* R) + (C8 \* T \* R^2) + (C9 \* T^2 \* R^2);

% Round the Heat Index to the nearest whole number

HI = round(HI);

end

% --- Calculate Heat Index for the given conditions ---

% a) T = 95 °F, R = 80 %

T\_a = 95;

R\_a = 80;

HI\_a = HI\_HeatIn(T\_a, R\_a);

fprintf('Heat Index for T = %d °F and R = %d %% is: %d °F\n', T\_a, R\_a, HI\_a);

% b) T = 100 °F, R = 100 % (saunadagi holat)

T\_b = 100;

R\_b = 100;

HI\_b = HI\_HeatIn(T\_b, R\_b);

fprintf('Heat Index for T = %d °F and R = %d %% is: %d °F (saunadagi holat)\n', T\_b, R\_b, HI\_b);

5-savol

% Teskari Fibonachchi doimiysini hisoblash uchun soddalashtirilgan skript

% Hisoblanadigan hadlar soni

n\_qiymatlari = [10, 50, 100];

% Har bir hadlar soni uchun hisoblashni amalga oshirish

for n = n\_qiymatlari

% Dastlabki ikki Fibonachchi soni

fib1 = 1;

fib2 = 1;

% Teskari Fibonachchi doimiysining yig'indisini hisoblash

if n >= 1

sum\_fib = 1/fib1;

if n >= 2

sum\_fib = sum\_fib + 1/fib2;

for i = 3:n

fib\_next = fib1 + fib2;

sum\_fib = sum\_fib + 1/fib\_next;

fib1 = fib2;

fib2 = fib\_next;

end

end

fprintf('%d ta had uchun teskari Fibonachchi doimiysi: %f\n', n, sum\_fib);

else

disp('Hadlar soni kamida 1 ga teng bo''lishi kerak.');

end

end