

SELÇUK ÜNİVERSİTESİ

Elektrik-Elektronik Mühendisliği

Robot Kolu Simülasyon Projesi

ÖĞRENCİLER

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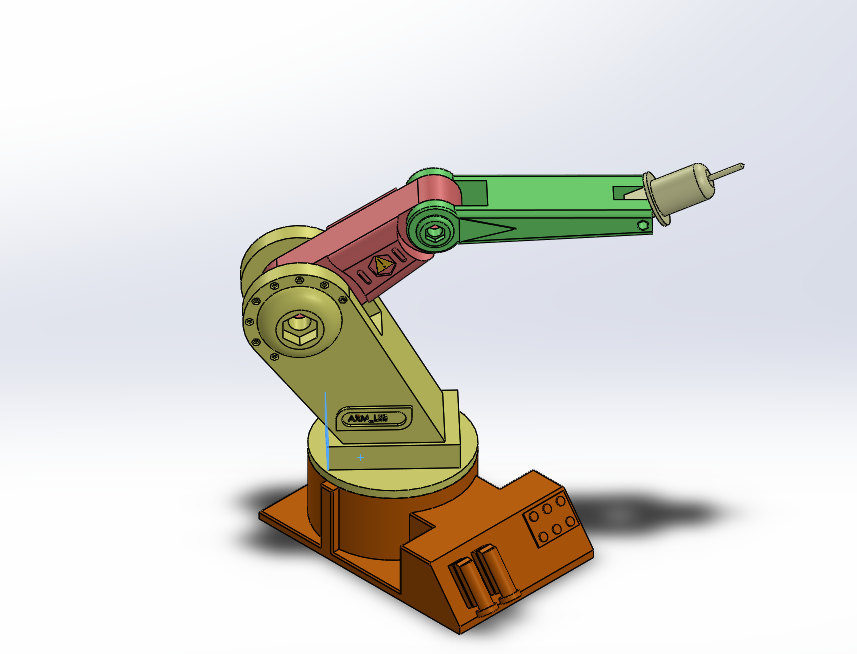
PROJENİN AMACI

Bu projede yapılmak istenen solidworks de çizilen robotun matlaba atılarak gui uygulaması üzerinde bir simülasyon yapılmasıdır.Bu projede gui uygulaması butonları atayarak kol uvuzlarının oynatılması

ve simülasyon üzerinde oynatılmasıdır.

PROJENİN ÇALIŞMA ŞEKLİ

İlk önce solidworksde çizmiş olduğumuz robotu ;



Bu çizimi matlab üzerine atarak kod yazma işlemi ve gui üzerinde uygulama aşalarına geçiyoruz.Öncelikle kodlar ;

function varargout = RRR\_Robot(varargin)

% RRR\_ROBOT MATLAB code for RRR\_Robot.fig

% RRR\_ROBOT, by itself, creates a new RRR\_ROBOT or raises the existing

% singleton\*.

%

% H = RRR\_ROBOT returns the handle to a new RRR\_ROBOT or the handle to

% the existing singleton\*.

%

% RRR\_ROBOT('CALLBACK',hObject,eventData,handles,...) calls the local

% function named CALLBACK in RRR\_ROBOT.M with the given input arguments.

%

% RRR\_ROBOT('Property','Value',...) creates a new RRR\_ROBOT or raises the

% existing singleton\*. Starting from the left, property value pairs are

% applied to the GUI before RRR\_Robot\_OpeningFcn gets called. An

% unrecognized property name or invalid value makes property application

% stop. All inputs are passed to RRR\_Robot\_OpeningFcn via varargin.

%

% \*See GUI Options on GUIDE's Tools menu. Choose "GUI allows only one

% instance to run (singleton)".

%

% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help RRR\_Robot

% Last Modified by GUIDE v2.5 24-May-2018 02:07:27

% Begin initialization code - DO NOT EDIT

gui\_Singleton = 1;

gui\_State = struct('gui\_Name', mfilename, ...

'gui\_Singleton', gui\_Singleton, ...

'gui\_OpeningFcn', @RRR\_Robot\_OpeningFcn, ...

'gui\_OutputFcn', @RRR\_Robot\_OutputFcn, ...

'gui\_LayoutFcn', [] , ...

'gui\_Callback', []);

if nargin && ischar(varargin{1})

gui\_State.gui\_Callback = str2func(varargin{1});

end

if nargout

[varargout{1:nargout}] = gui\_mainfcn(gui\_State, varargin{:});

else

gui\_mainfcn(gui\_State, varargin{:});

end

% End initialization code - DO NOT EDIT

% --- Executes just before RRR\_Robot is made visible.

function RRR\_Robot\_OpeningFcn(hObject, eventdata, handles, varargin)

% This function has no output args, see OutputFcn.

% hObject handle to figure

% eventdata reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

% varargin command line arguments to RRR\_Robot (see VARARGIN)

% Choose default command line output for RRR\_Robot

handles.output = hObject;

% Update handles structure

guidata(hObject, handles);

% UIWAIT makes RRR\_Robot wait for user response (see UIRESUME)

% uiwait(handles.figure1);

% --- Outputs from this function are returned to the command line.

function varargout = RRR\_Robot\_OutputFcn(hObject, eventdata, handles)

% varargout cell array for returning output args (see VARARGOUT);

% hObject handle to figure

% eventdata reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure

varargout{1} = handles.output;

function Theta\_1\_Callback(hObject, eventdata, handles)

% hObject handle to Theta\_1 (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of Theta\_1 as text

% str2double(get(hObject,'String')) returns contents of Theta\_1 as a double

% --- Executes during object creation, after setting all properties.

function Theta\_1\_CreateFcn(hObject, eventdata, handles)

% hObject handle to Theta\_1 (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.

% See ISPC and COMPUTER.

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

function Theta\_2\_Callback(hObject, eventdata, handles)

% hObject handle to Theta\_2 (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of Theta\_2 as text

% str2double(get(hObject,'String')) returns contents of Theta\_2 as a double

% --- Executes during object creation, after setting all properties.

function Theta\_2\_CreateFcn(hObject, eventdata, handles)

% hObject handle to Theta\_2 (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.

% See ISPC and COMPUTER.

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

function Theta\_3\_Callback(hObject, eventdata, handles)

% hObject handle to Theta\_3 (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of Theta\_3 as text

% str2double(get(hObject,'String')) returns contents of Theta\_3 as a double

% --- Executes during object creation, after setting all properties.

function Theta\_3\_CreateFcn(hObject, eventdata, handles)

% hObject handle to Theta\_3 (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.

% See ISPC and COMPUTER.

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

% --- Executes on button press in btn\_Forward.

function btn\_Forward\_Callback(hObject, eventdata, handles)

% hObject handle to btn\_Forward (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

Th\_1 = str2double(handles.Theta\_1.String)\*pi/180;

Th\_2 = str2double(handles.Theta\_2.String)\*pi/180;

Th\_3 = str2double(handles.Theta\_3.String)\*pi/180;

L\_1 = 20;

L\_2 = 50;

L\_3 = 40;

L(1) = Link([0 L\_1 0 pi/2]);

L(2) = Link([0 0 L\_2 0]);

L(3) = Link([0 0 L\_3 0]);

Robot = SerialLink(L);

Robot.name = 'RRR\_Robot';

Robot.plot([Th\_1 Th\_2 Th\_3]);

T = Robot.fkine([Th\_1 Th\_2 Th\_3]);

handles.Pos\_X.String = num2str(floor(T(1,4)));

handles.Pos\_Y.String = num2str(floor(T(2,4)));

handles.Pos\_Z.String = num2str(floor(T(3,4)));

function Pos\_X\_Callback(hObject, eventdata, handles)

% hObject handle to Pos\_X (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of Pos\_X as text

% str2double(get(hObject,'String')) returns contents of Pos\_X as a double

% --- Executes during object creation, after setting all properties.

function Pos\_X\_CreateFcn(hObject, eventdata, handles)

% hObject handle to Pos\_X (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.

% See ISPC and COMPUTER.

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

function Pos\_Y\_Callback(hObject, eventdata, handles)

% hObject handle to Pos\_Y (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of Pos\_Y as text

% str2double(get(hObject,'String')) returns contents of Pos\_Y as a double

% --- Executes during object creation, after setting all properties.

function Pos\_Y\_CreateFcn(hObject, eventdata, handles)

% hObject handle to Pos\_Y (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.

% See ISPC and COMPUTER.

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

function Pos\_Z\_Callback(hObject, eventdata, handles)

% hObject handle to Pos\_Z (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of Pos\_Z as text

% str2double(get(hObject,'String')) returns contents of Pos\_Z as a double

% --- Executes during object creation, after setting all properties.

function Pos\_Z\_CreateFcn(hObject, eventdata, handles)

% hObject handle to Pos\_Z (see GCBO)

% eventdata reserved - to be defined in a future version of MATLAB

% handles empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.

% See ISPC and COMPUTER.

if ispc && isequal(get(hObject,'BackgroundColor'), get(0,'defaultUicontrolBackgroundColor'))

set(hObject,'BackgroundColor','white');

end

% --- Executes on button press in btn\_Inverse.

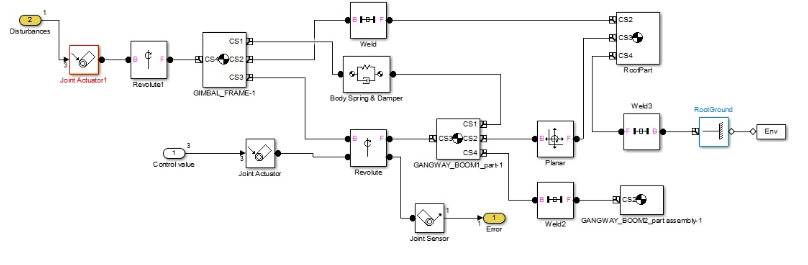
function btn\_Inverse\_Callback(hObject, eventdata, handles)

% hObject handle to btn\_Inverse (see GCBO)

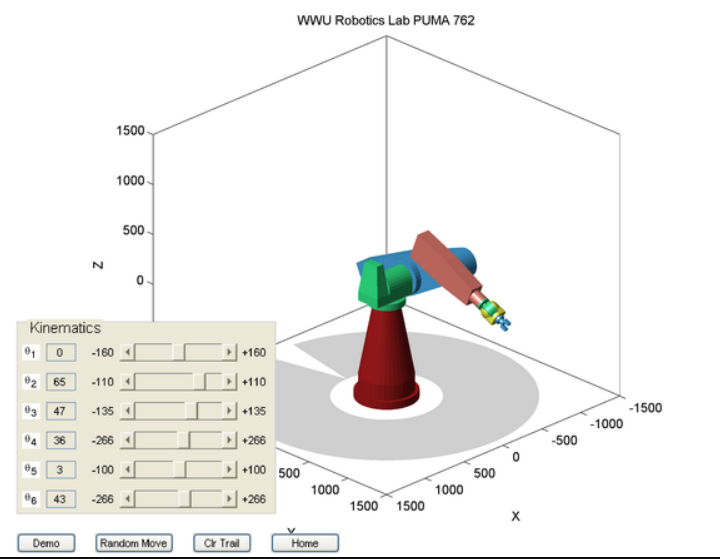
% eventdata reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

Matlab üzerinde başlatma tuşuna basdıgımızda bir robot kolu eksenleri tasarlama ekranı çıkacak ve burda robot kollarının uzuvlarının çalışma prensiblerini ve nasıl çalıştırabildigimiz konusunda yardımcı olacak ekran çıkacak.Bkz ;



Bu aşamadan sonra da matlab gui uygulaması ile buton atamları ve robot kollarını çalıştıracagımız ve komut verecegim ayrıca uzay ekseninde x,y,z koordinatlarında rastgele verdigimiz açı değerlerinde robot kolunun gitmesini sağlayacak bir gui uygulaması tasarladık.Bkz;



Bu şekilde komut girme ekranı çıkmaktadır.En son aşama olup ,bu süreçde verdiğimiz açılara göre robot kolu hareket etmektedir.

Bu aşamda matlam simulink veri dosyası da büyük yardımcı olmuş ve kullanılmıştır.