بسم الله الرحمن الرحيم

**THE ISLAMIC UNIVERSITY – FACULTY OF ENGINEERING  
COMPUTER ENGINEERING DEPARTMENT**

**SIGNALS AND LINEAR SYSTEMS LABORATORY  
`EELE 3110**

**GUI program Matlab**

***By***

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ABSTRACT

This is an applied project for what we have taken in the Signals and Linear System lab course, using MATLAB and App Designer to create a simple project that give users the ability to do a lot of different mathematical stuff that they need in the signals field, and make the life easier for them.

# Introduction

## About MATLAB:

MATLAB (an abbreviation of "MATrix LABoratory") is a proprietary multi-paradigm programming language and numeric computing environment developed by MathWorks. MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages.

Although MATLAB is intended primarily for numeric computing, an optional toolbox uses the MuPAD symbolic engine allowing access to symbolic computing abilities. An additional package, Simulink, adds graphical multi-domain simulation and model-based design for dynamic and embedded systems.

As of 2020, MATLAB has more than 4 million users worldwide.[21] MATLAB users come from various backgrounds of engineering, science, and economics.[[1]](#footnote-1)

## About App Desinger:

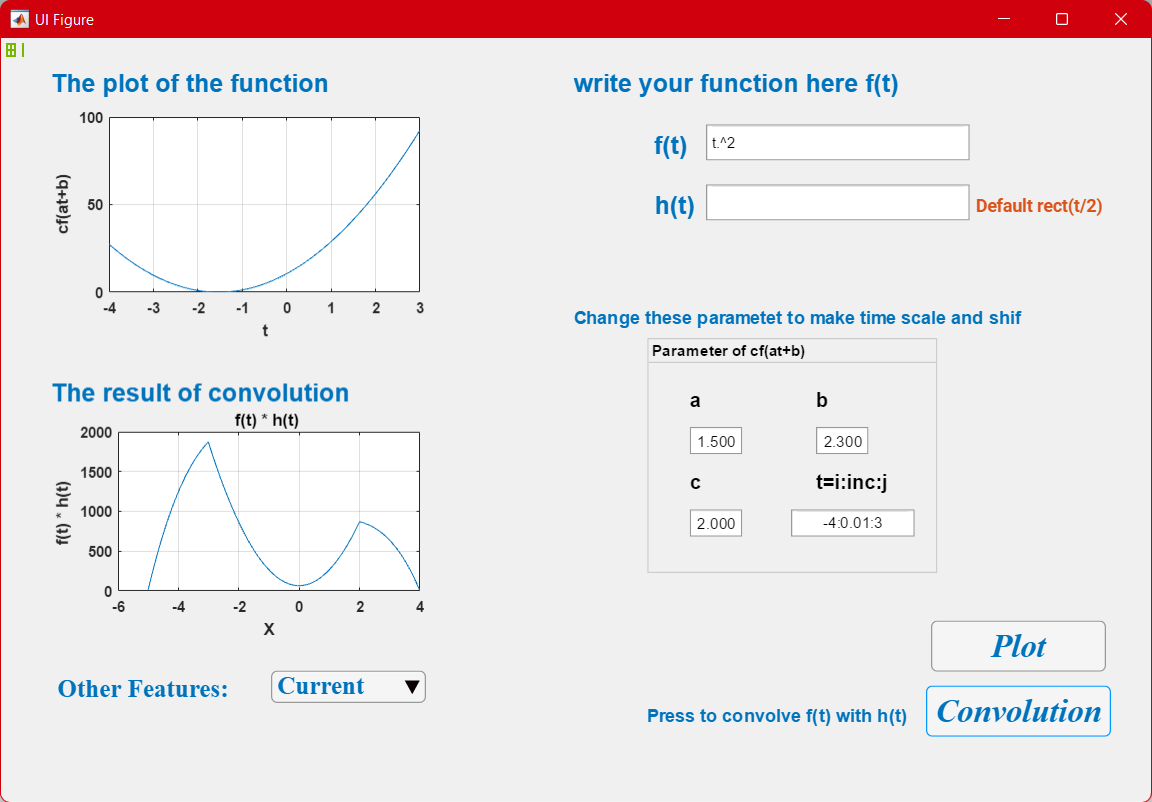
As they mentioned in their website, “App Designer lets you create professional apps without having to be a professional software developer. Drag and drop visual components to lay out the design of your graphical user interface (GUI) and use the integrated editor to quickly program its behavior.”*[[2]](#footnote-2)*

# Project Components:

This project has six screens, every screen has its functionality, we will explain each separately.

## The Main Screen:

This screen has two functions, the first is plotting any given function, the other is making a convolution between two functions and plotting the result.

  
As we see above, this screen contains a lot of components.

Labels:

All labels here have the same reason which is guide the user what and where to do.

Buttons:

We have two buttons here:

* Plot: to plot the given function with shifting and scaling in the first UI Axis.
* Convolution: making the convolution operation between f and h and plot the result in the second UI Axis.

### Text Field:

We have six text field here:

* f(t): read the function from the user, we have to mention the text field read the expression as the MATLAB read, so the user should be aware to use dot product and multiplication to avoid errors.
* h(t): the same as f(t) text field, read h(t), but if the user left it empty, don’t worry it has a default value which is rect(t/2).
* a, b and c: time scaling, time shifting and y scaling respectively.
* Interval: it reads the start, increasing value and the end to make an interval of values to plot them.

### UI Axis:

We have two of them, the first one to plot the processed f(t) at the given interval, the second plot the result of the convolution.

### Drop Down List:

The most interesting part of our project, each option will open an interesting screen which contains its own benefits.

## The Transformations Screen:

This….

### C1:

Blabala…..

### C2:

Blabalbalba….

And keep going for all the screen with the same design…

# Conclusion:

We will type what we learn from this project

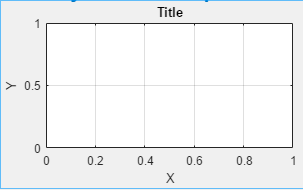
**Ideas project :**

* **Plot the function**
* **Plot the function transformation**
* **Plot the convolution two signal**
* **Integrals**
* **Derivatives**
* **Solve equations**

**design steps :**

**main screen:**

* **UIAxes )** **To display the graphic in a screen Convolution or scaled or shift or plot (**

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* ** EditField)** **to write the function(**
* **Label for guidance**
* **Three button :**

1. **Button Convolution**
2. **Button plot**
3. **Button To go to the Transformation screen**

* **Parameter Edit Field and label Group(Specialist in scaling, frequency and offset(**
* **Tools Drop Down (Go to the Transforms, Integrals, Derivatives, and Solve Equations screen(**

**Screen Transformations:**

* ** EditField)** **to write the function(**
* **Label :**

1. **Label for guidance**
2. **Label for display the output**

* **Tools Drop Down(to go fourier ,laplace ,Z )**
* **Button (go back)**

**Screen integrals :**

* Edit field :

1. Edit field to enter the function
2. Two edit field to get integration limits
3. Edit field to get variable to integrate
4. Edit field to display the output

* Label (for guidance)
* Button :

1. Integrate
2. Exit

* StateSwitch (to switch from unbounded to bounded integral limits)

**Screen derivatives :**

* Edit field :

1. Edit field to enter the function
2. Edit field to get degree
3. Edit field to get variable
4. Edit field to find derivative in exact value
5. Edit field to display the output in general form (if don’t put exact value )
6. Edit field to display the output in exact

* Label (for guidance)
* Button :

1. Derivatives
2. Exit

**Scree solve equation:**

* Label (for guidance)
* Edit field :

1. Edit field to enter the function
2. Edit field to get variable you want solve respect with
3. Edit field to display the output

* Button :

1. Solve equation
2. Exit

1. <https://en.wikipedia.org/wiki/MATLAB> [↑](#footnote-ref-1)
2. <https://www.mathworks.com/products/matlab/app-designer.html> [↑](#footnote-ref-2)