

ANALYSIS OF DIFFERENT MODULATION ON GUI

A PROJECT REPORT

**SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE
OF**

**BACHELOR OF TECHNOLOGY
IN
ELECTRONICS AND COMMUNICATION ENGINEERING**

SUBMITTED BY:

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2K19/EC/71 & 2K19/EC/077

UNDER THE SUPERVISOR

PROF. PIYUSH TEWARI



**ELECTRONICS AND COMMUNICATION
DELHI TECHNOLOGICAL UNIVERSITY**

**(Formerly Delhi College of Engineering)
Bawana Road, Delhi-110042**

MAY, 2021

ELECTRONICS AND COMMUNICATION

DELHI TECHNOLOGICAL UNIVERSITY
(Formerly Delhi College of Engineering)
Bawana Road, Delhi-110042

CANDIDATE'S DECLARATION

We, Harshal Chowdhary & Ishita Agrawal, Roll Nos. 2K19/EC/071 & 2K19/EC/077 students of B.Tech Electronics and Communication, hereby declare that the project Dissertation title “Analysis of Different Modulation on GUI” which is submitted by us to the Department of Electronics and Communication, Delhi Technological University, Delhi in partial fulfilment of the requirement for the award of the degree of Bachelor of Technology, is original and not copied from any source without proper citation. This work has not previously formed the basis for the award of any Degree, Diploma Associateship, Fellowship or other similar title or recognition.

Place: Delhi
Date: 22 May 2021

Harshal Chowdhary & Ishita Agrawal

ELECTRONICS AND COMMUNICATION
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(Formerly Delhi College of Engineering)
Bawana Road, Delhi-110042

CERTIFICATE

I hereby certify that the Project Dissertation titled “Analysis of Different Modulation on GUI” which is submitted by Harshal Chowdhary & Ishita Agrawal, Roll Nos. 2K19/EC/071 & 2K19/EC/077, Electronics & Communication, Delhi Technological University, Delhi in partial fulfilment of the requirement for the award of the degree of Bachelor of Technology, is a record of the project work carried out by the students under my supervision. To the best of my knowledge this work has not been submitted in part or full for any Degree or Diploma to this University or elsewhere.

Place: Delhi
Date: 22 May 2021

Prof. Piyush Tewari
Supervisor

ACKNOWLEDGEMENT

Presentation inspiration and motivation have always played a key role in the success of any venture.

We express our sincere thanks to **Prof. Yogesh Singh, Vice Chancellor, Delhi Technological University, Delhi.**

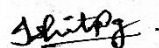
We pay our deep sense of gratitude to **Prof. N.S. Raghava (HOD) of EC Department, Delhi Technological University, Delhi** to encourage us to the highest peak and to provide us the opportunity to prepare the project. We are immensely obliged to for their elevating inspiration, encouraging guidance and kind supervision in the completion of our project.

We feel to acknowledge our indebtedness and deep sense of gratitude to our guide **Prof. Piyush Tewari** whose invaluable guidance and kind supervision given to us throughout the course which shaped the present work as its show.

Last, but not the least, **our parents** are also an important inspiration for time. So with due regards. We express our gratitude to them.



HARSHAL CHOWDHARY (2K19/EC/071)



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ABSTRACT

we always tried to find the solutions to real life problems in our innovative projects using concepts of subjects. For example we built DTU Security System and DTU attendance system in which we used MATLAB do design the same.

We noticed that in our batch generally students were unable to understand the concepts of communication system. So we decided to conduct a survey having aim to look upon the answer of the question that what are problems that they are facing in understanding the concepts.

After going through their responses we decided to build a platform which will solve the above stated problems by the students. That's why we decided to build a platform using MATLAB app designer which can be used for teaching purpose.

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SURVEY

We conducted a survey through Google form^[1] in which we asked students of second year E.C. branch of our university, in which we asked them to share the problems with us which they are facing in Communication System Subject (EC-206). Results of these surveys is being shared below.

Name *

Your answer

Roll No.

Your answer

In which of the following fields, you found communication system tough?(You can select multiple options) *

☐ Theory

☐ Visualisation of concept

☐ Labs/Experiment

☐ Other:

Any suggestion that would make the understanding of communication system better. *

Your answer

Figure 1- Survey Form

In which of the following fields, you found communication system tough?(You can select multiple options)



37 responses

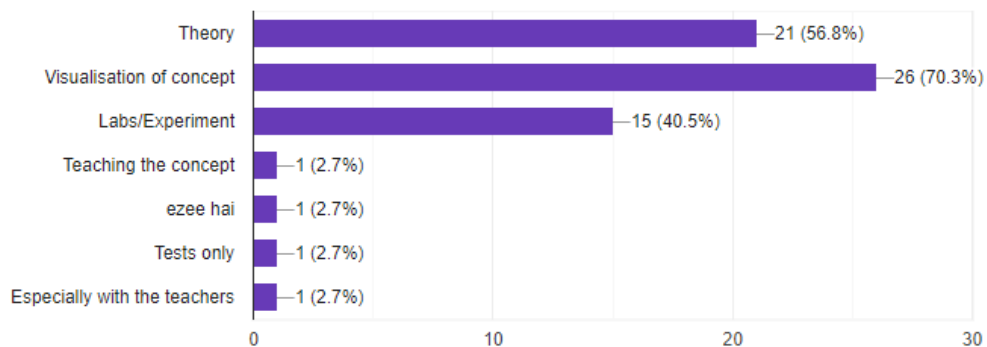


Figure 2 - Summary Of Question related to problem faced

We clearly draw the inference that to for proper understanding of Communication System by student. We need to work on the above mentioned problems like Visualization of concept and theory.

Motivation

As of now we always tried to find the solutions to real life problems in our innovative projects using concepts of subjects. For example we built DTU Security System and DTU attendance system in which we used MATLAB do design the same.

We noticed that in our batch generally students were unable to understand the concepts of communication system. So we decided to conduct a survey having aim to look upon the answer of the question that what are problems that they are facing in understanding the concepts.

After going through their responses we decided to build a platform which will solve the above stated problems by the students. That's why we decided to build a platform using MATLAB app designer which can be used for teaching purpose.

We always received some suggestion that we would like to share.

Yes , I will listed few suggestions here :

- 1) first of all , communication system should be taught with systematic ways
- 2) tell the theory with pointwise notes with their diagram
- 3) then visualised concept of this short theory of any topic should be taught in class with examples
- 4) at last give Question on every topic turn wise so that concept will Cristal clear
- 5) and then a summary of every unit will be there and doubt obviously.

For labs :

Few suggestions are:

- 1) first tell the theory of every experiment
- 2) then give some hints on matlab implementation with flow charts etc
- 3) when all students done with their codes , then instructor of lab should point out Thier mistakes and at last done simulation themselves with linewise teaching of codes and concept behind so that every class understand it better .

If the concepts would be visualised in a better way then the problem might be solved to some extent

CS is a theory oriented subject in its core. Apart from using more examples from real life and a few other minor improvements, I don't think there's much scope.

Tests duration should be atleast an hour

If one can visualise CS better, it can help

Better simulators, teachers actually teaching us using their own writing.

If we would have less strict professors so that we can share all the problems related to subject to them and a virtual lab then it can become more easier.

We need more effort to make topics clear. Its really confusing. Its always good to take every section together in such case.

More focus of problem solving and updated syllabus with focus of experiment and simulations.

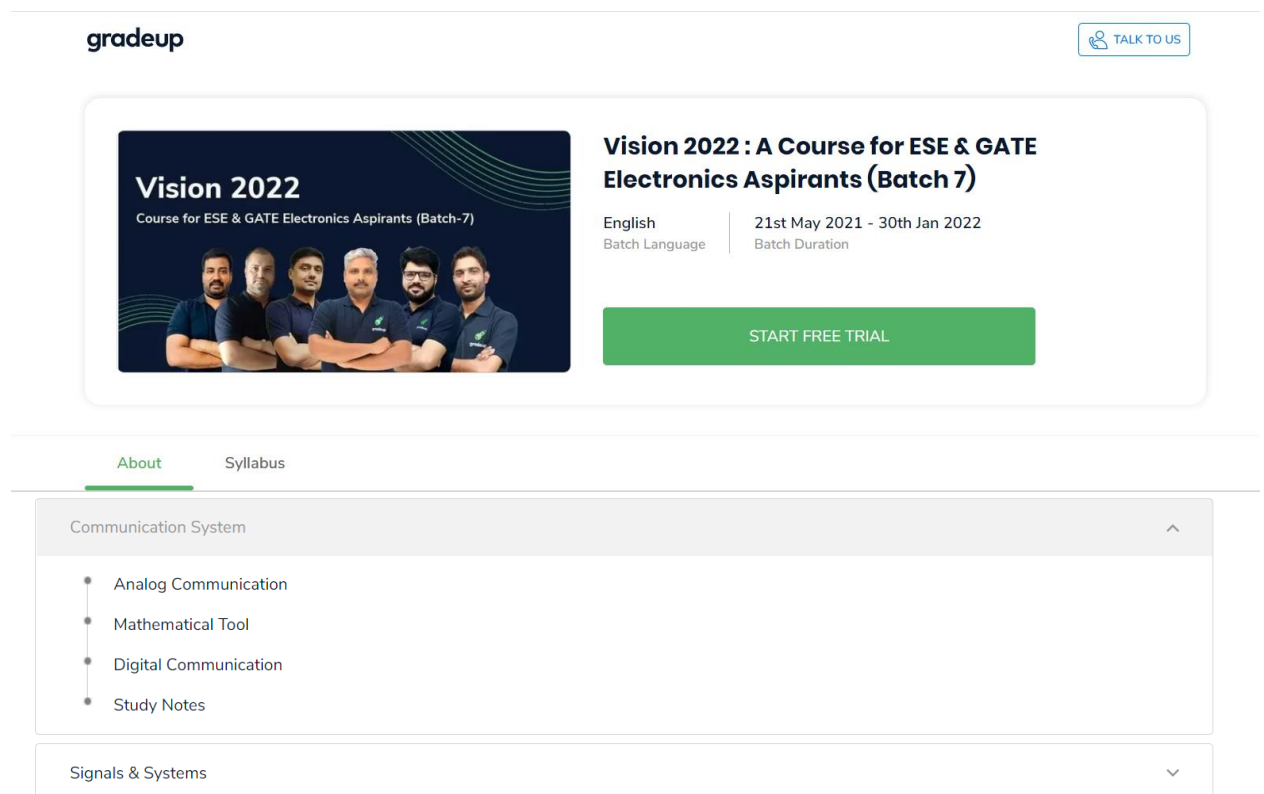
Offline classes ..

Reduction of syllabus

Other platforms

While doing research of our project. We decided to look online for various platform which taught about ECE communication system as main. We found that there are many platform which teach ECE in general but almost every other platform focus on GATE or ESE exam. None of them is based on the problem set of above drawn inference from our survey. We also found out that there are many platform which is working to solve the same set of problem but not in electronic and communication field. Most of them are tech based teaching topics like cpp, c programming language and other computer based topics.

1) Gradeup



gradeup [TALK TO US](#)

Vision 2022
Course for ESE & GATE Electronics Aspirants (Batch-7)

English
Batch Language

21st May 2021 - 30th Jan 2022
Batch Duration

[START FREE TRIAL](#)

[About](#) [Syllabus](#)

Communication System

- Analog Communication
- Mathematical Tool
- Digital Communication
- Study Notes

Signals & Systems

Figure 3 - gradeup elearning platform

Gradeup (Grade Stack Learning Pvt. Ltd.) is India's largest exam preparation destination, loved by millions of aspirants across the country. Through our website and app, we help more than 1.1 crore registered students to prepare actively for various exams & score better.

They believe that people prepare better when they prepare together; by questioning, helping & challenging each other. Hence at the very core of our being lies a community of students & expert mentors. Established in the year 2015, Gradeup belongs to Times Internet. We have established & nurtured highly engaging exam-specific communities of students and mentors for SSC, Banking, Railway, Teaching, JEE, GATE, NEET, UPSC, Defence and State level exams. The Gradeup community lets users collectively solve each other's doubts, and interactively learn and compete with each other through quizzes and

mock tests. It gives them access to prep material & previous year papers to score better in their exams.

2. Un-Academy

'Unacademy' is an Indian educational technology company, based in Bangalore. Originally created as a YouTube channel in 2010 by Gaurav Munjal, the company was founded in 2015 by Munjal, Roman Saini, and Hemesh Singh. The company has a network of over 18,000 educators, and offers preparation material for several professional and educational entrance exams. Unacademy lessons are in the form of Live Classes both free and via subscription.

Unacademy started in 2010 as a YouTube channel by Gaurav Munjal. In 2015, Unacademy was officially registered as an education company in Bangalore. A privately held company, Unacademy has secured funding through a series of offerings, including investments from US private equity firm General Atlantic, Facebook, Nexus Ventures, Blume Ventures, and Flipkart CEO Kalyan Krishnamurthy. As of December 2020, Unacademy was valued at US\$2.0 billion.

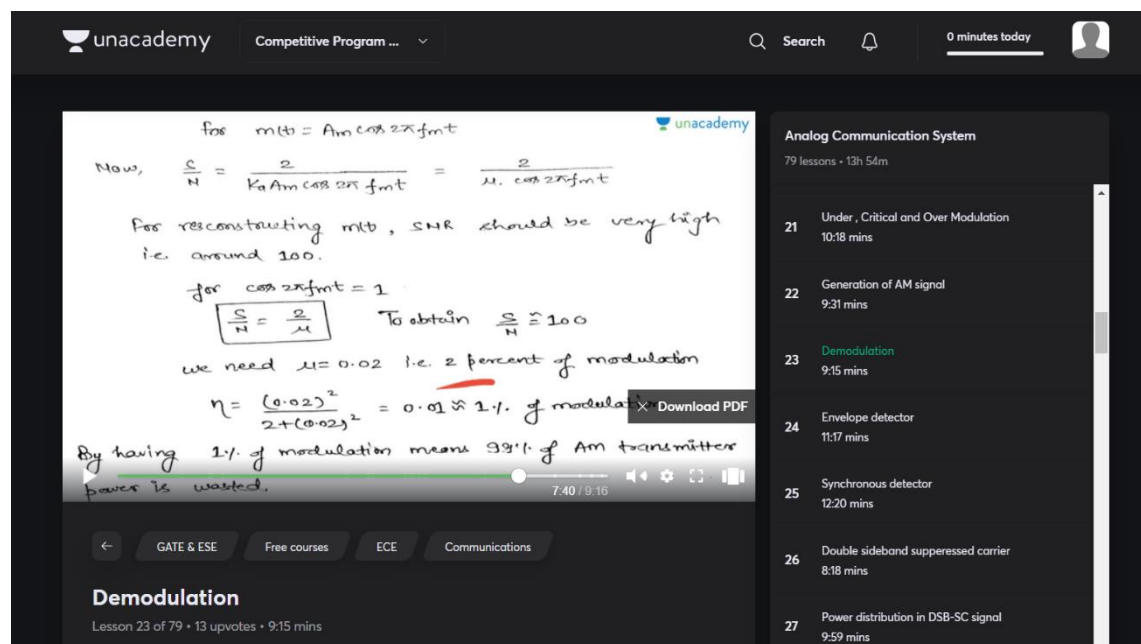


Figure 4 - Course Interface of Unacademy

Talking about their interface, we came to conclusion that there are many drawback that we noticed in their platform. Some of them are listed below.

1) Paid Courses:

There are many courses that they offer at their platform but they are unable to provide these courses for free. Being a Private company their main focus is to earn more and more profit and not providing basic education for free.

2) Visualization of concept:

Visualization of concept is not entertained on their platform. They are providing us solution of one of the problems that related to understanding of topics but they are unable to tackle the problem of visualization of concept.

Project Proposal

In our project proposal we proposed that we have GUI as shown below with many features available in them. Some of them are mentioned below.

We decided to have a download pdf button from where students can download notes of respective topic from the platform itself. After that we decided that for proper visualization, we will have plots at every node of the block diagram. Also we will have buttons which will toggle the above mentioned plots between frequency and time domain.

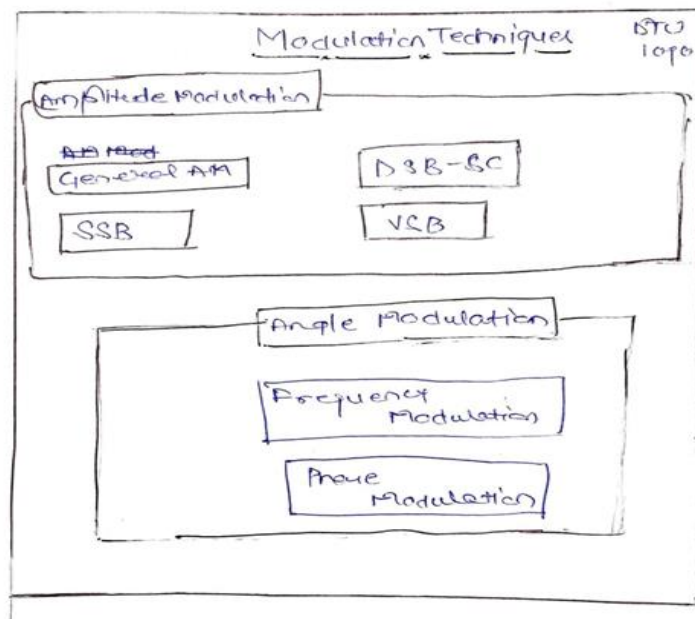
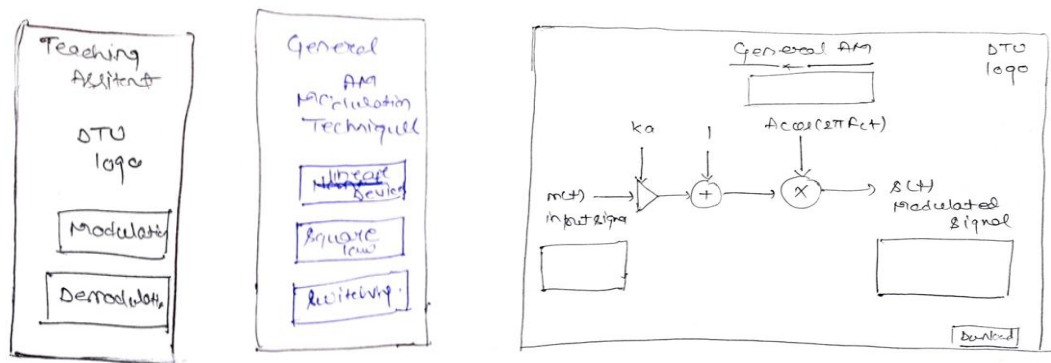


Figure 5 - PROPOSED GUI

Final Project

We implemented all the above feature with some modifications. We also added some new features to it which makes it more user friendly. One of them is changing of background colour of buttons when the respective signal is plotted.



Figure 6- Starting GUI Screen

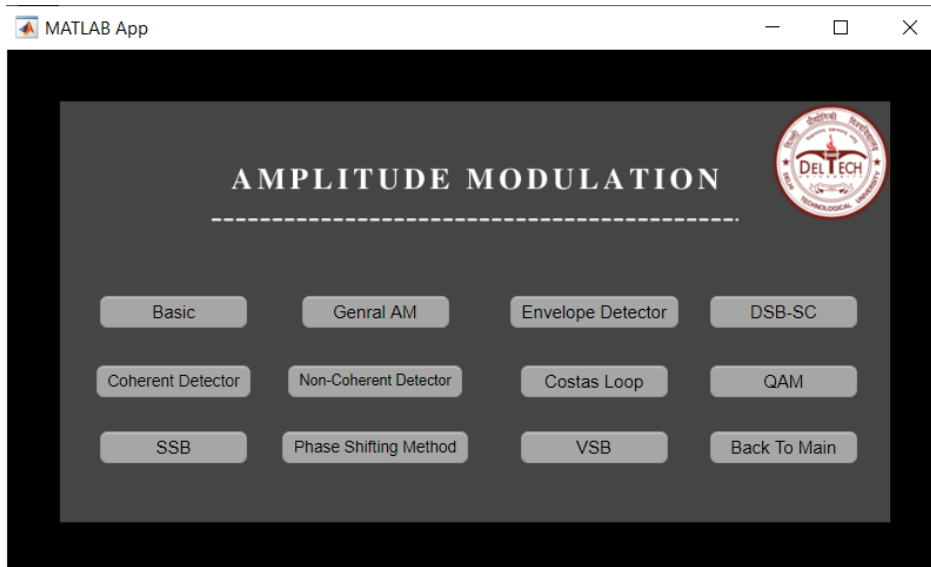


Figure 7 - AMPLITUDE MODULATION GUI

Conventional AM

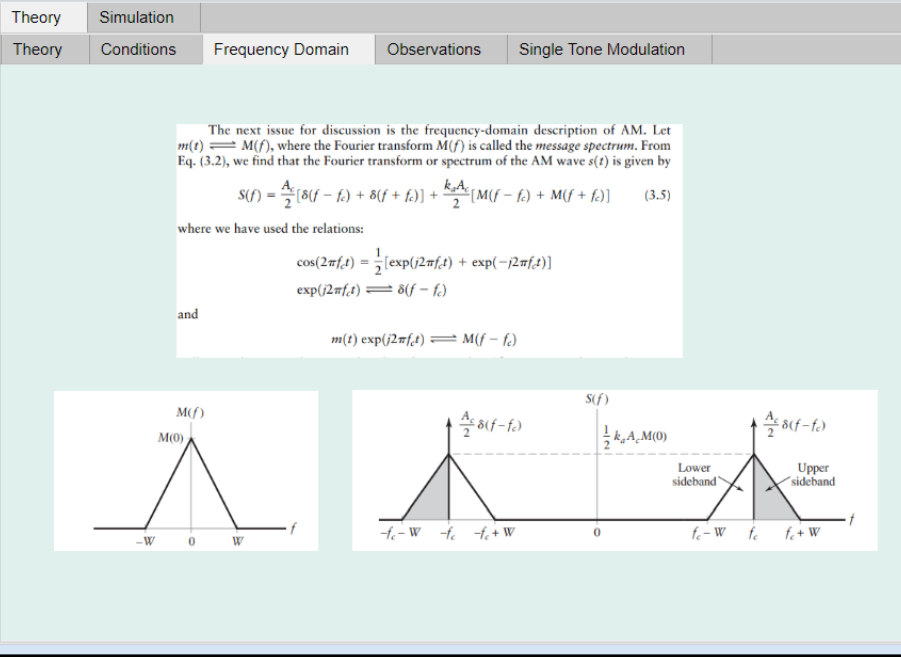


Figure 8 - Conventional AM Theory

Conventional AM

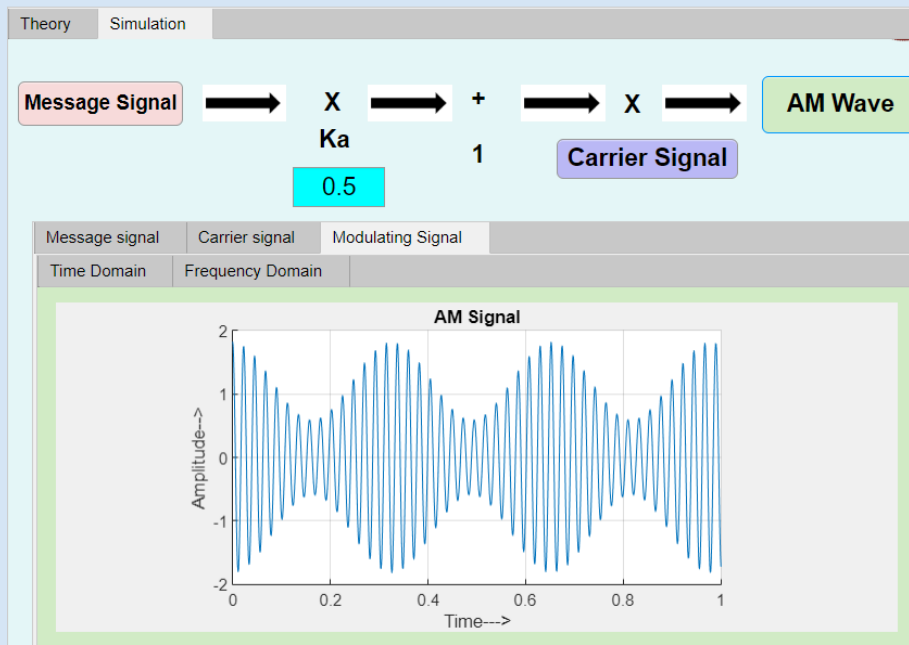


Figure 9 - simulation of am

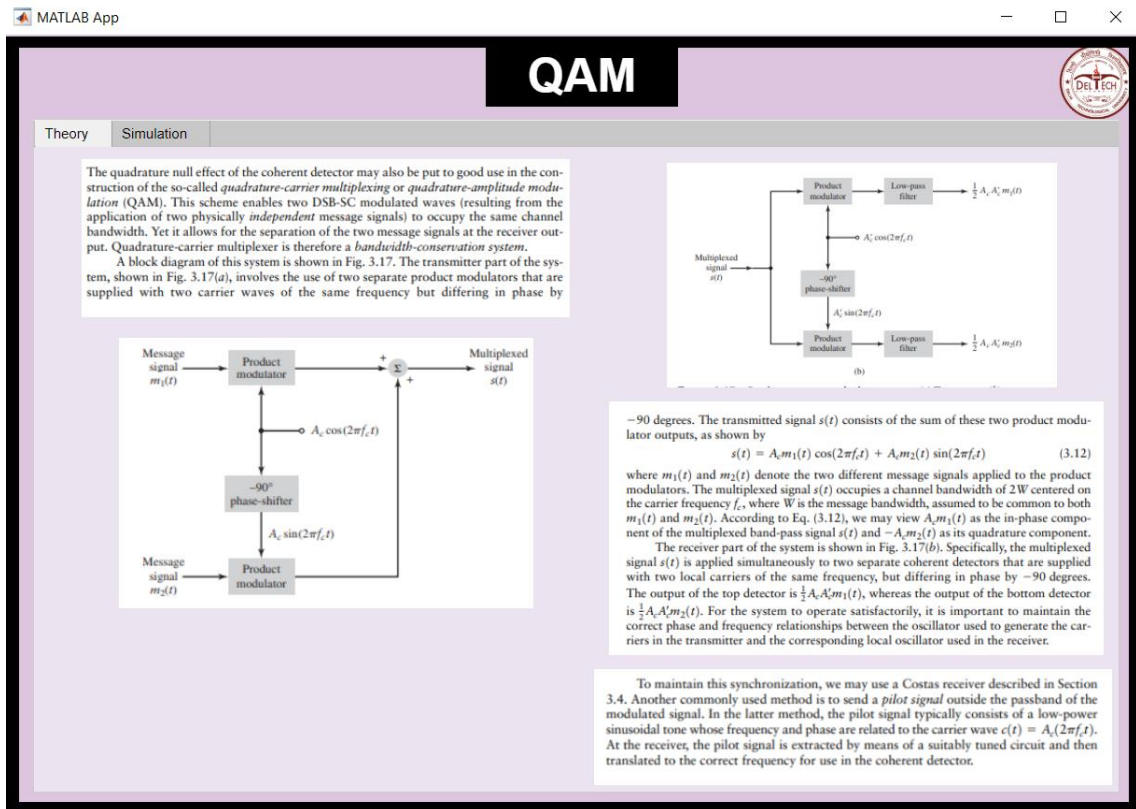


Figure 10 - Thoery of QAM

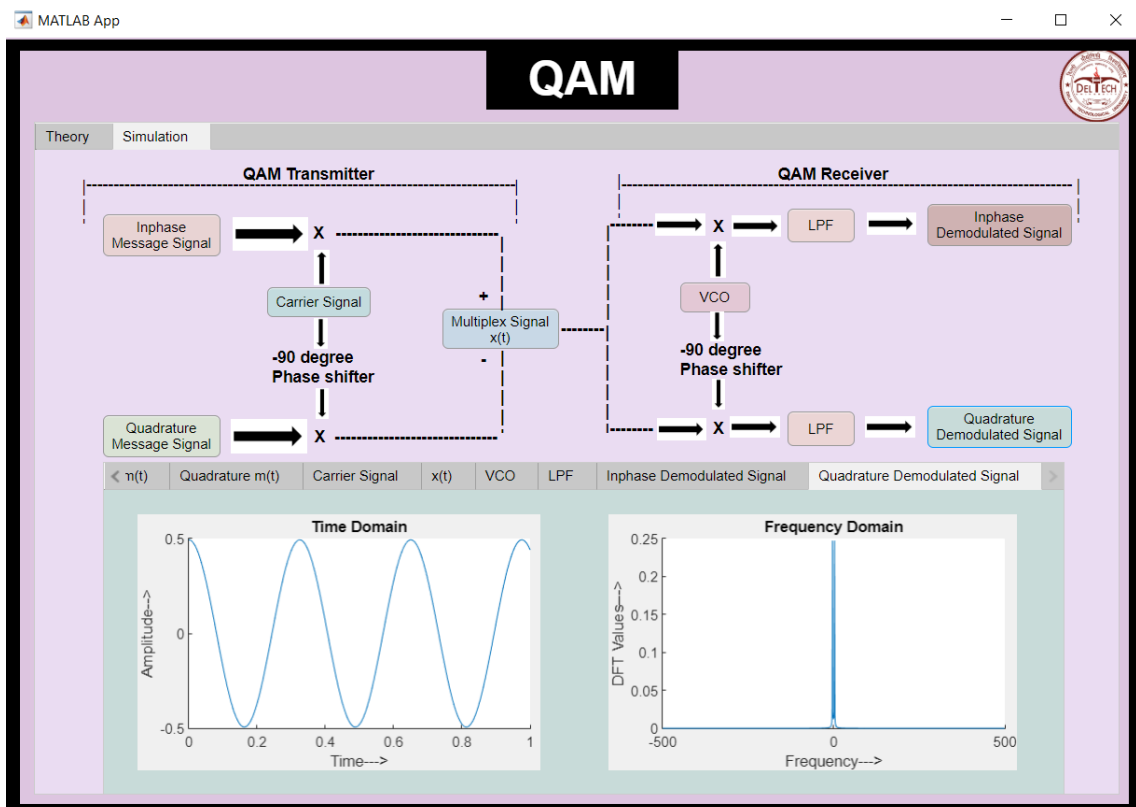


Figure 11 - Simulation of QAM

Field of Improvement

While working on our project we faced some problems. One of them was the frequently crashing of MATLAB App Designer. There are possibilities that same problem can be faced in future by any other user. It needed to get resolved. So we looked upon various field of improvement that can resolve this problem.

1) MATLAB Compiler

MATLAB Compiler™ enables you to share MATLAB® programs as standalone applications and web apps. With MATLAB Compiler you can also package and deploy MATLAB programs as Map Reduce and Spark™ big data applications and as Microsoft® Excel® Add-ins. End users can run your applications royalty-free using MATLAB Runtime.

To provide browser-based access to your MATLAB web apps, you can host them using the development version of MATLAB Web App Server™ included with MATLAB Compiler. MATLAB programs can be packaged into software components for integration with other programming languages (with MATLAB Compiler SDK™). Large-scale deployment to enterprise systems is supported through MATLAB Production Server™.

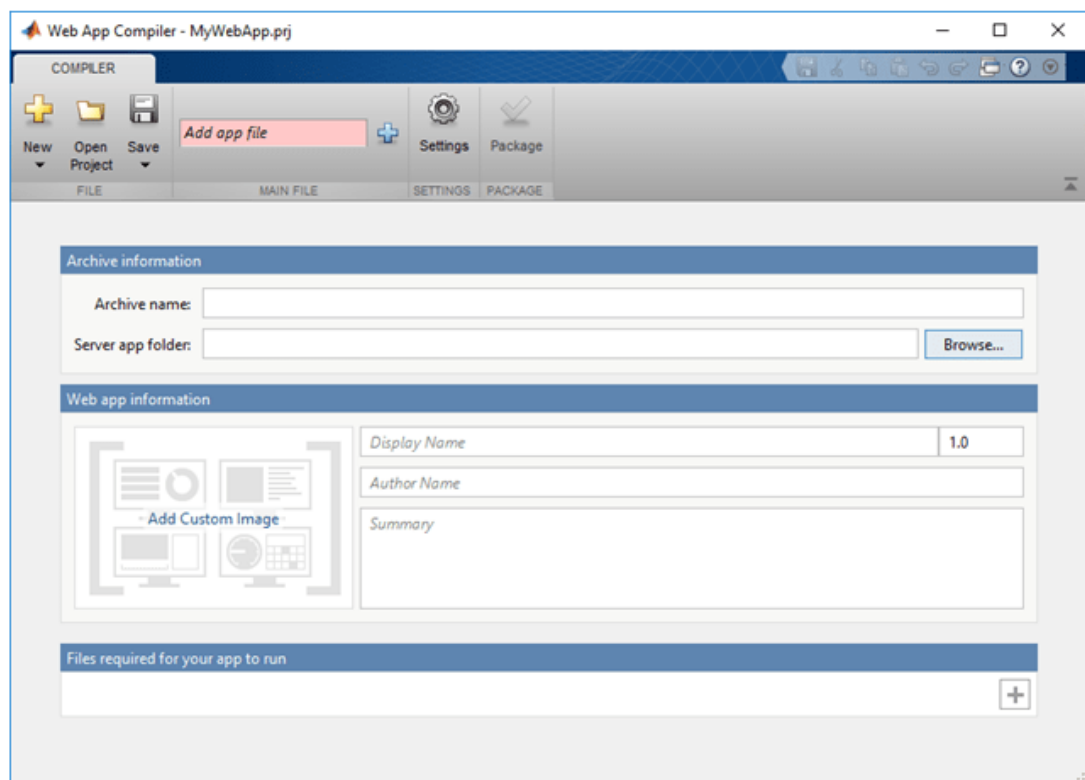


Figure 12 - MATLAB Compiler Interface

2) MATLAB Web App

Web apps are MATLAB apps that can run in a web browser. You create an interactive MATLAB app using App Designer, package it using the Web App Compiler, and host it using either the development version of MATLAB Web App Server or the MATLAB Web App Server™ product. Each web app has a unique URL and can be accessed from a web browser using HTTP or HTTPS protocols. The server has a home page listing all available hosted web apps. You share web apps by sharing the unique URL to a web app or the URL to the home page of the server. Web apps are designed to run only within a trusted intranet environment, not in the open Internet. For more information, see Potential Risks. Only apps designed using App Designer can be deployed as web apps. For more information, see Develop Apps Using App Designer. Web apps are supported on Windows®, Linux®, and macOS. For a list of supported web browsers, see Supported Browsers and Platform Incompatibilities. MATLAB Compiler™ ships with the development version of MATLAB Web App Server. However, if you want to integrate the server in an enterprise ecosystem with authentication and role-based access capabilities, continue to run web apps created using different releases of MATLAB, have no limit on the number of end-users accessing web apps, you need to purchase the MATLAB Web App Server product. For details, see MATLAB Web App Server Differences.

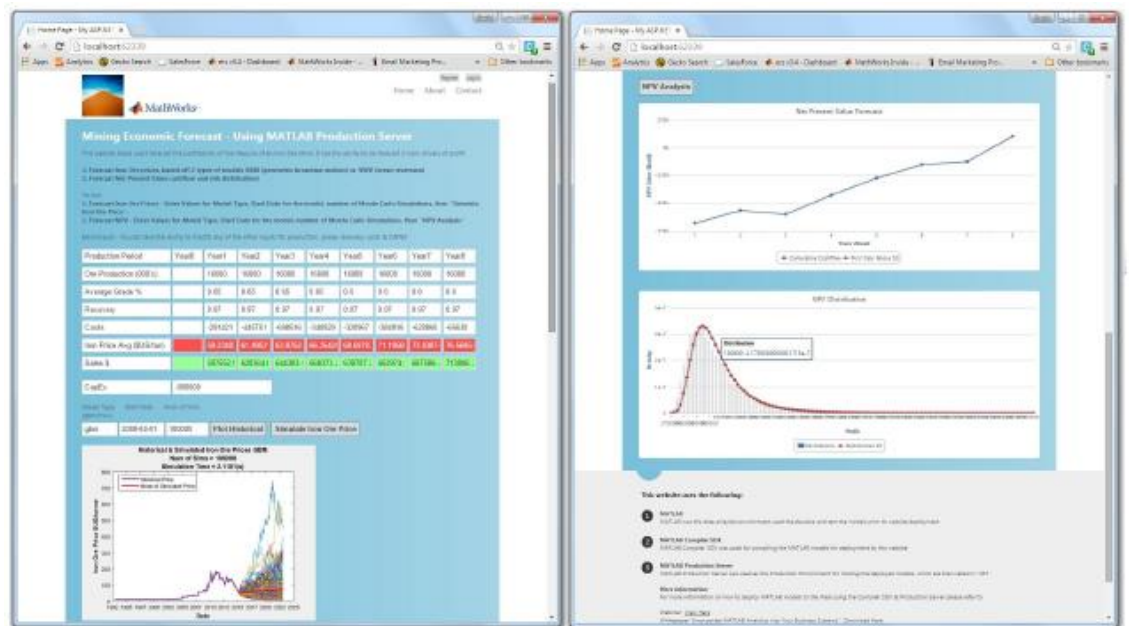


Figure 13- MATLAB Web App Interface

3) Tkinter

MATLAB is heavy software when we talk about the Basic System Requirements. There will be a time when we need to switch to different platform. For such kind of situation we decided to find an alternative of MATLAB App Designer for that we chose tkinter as language used in tkinter python which is easy to learn and also provide libraries which is similar to MATLAB codes or function.

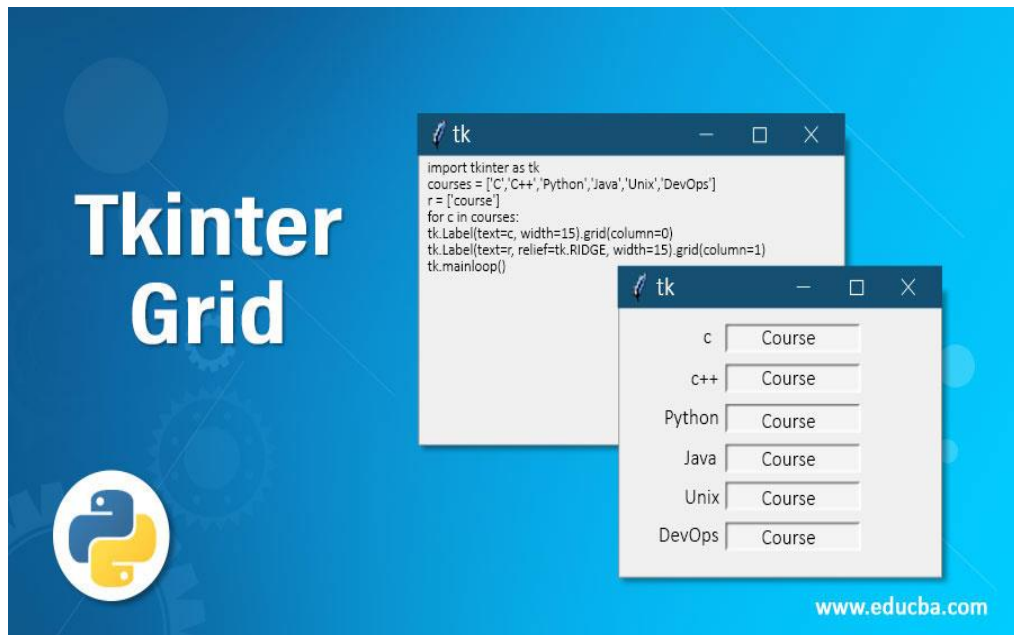


Figure 14 -tkinter platform

Tkinter is a Python binding to the Tk GUI toolkit. It is the standard Python interface to the Tk GUI toolkit, and is Python's *de facto* standard GUI. Tkinter is included with standard Linux, Microsoft Windows and Mac OS X installs of Python. The name *Tkinter* comes from *Tk interface*. Tkinter was written by Fredrik Lundh Tkinter is free software released under a Python license.

Future Scope

1) Publishing Same Project as Web Apps

Currently our platform is working on MATLAB App designer which is a part of MATLAB. So we any other person want to access the same. He/She must have MATLAB on their system. Therefore we decided that in future we will use MATLAB compiler to make a standalone Desktop Application which can accessed by anyone irrespective the fact that they don't have MATLAB in their system.

We also decided that we will publish this on website using MATLAB web app feature so that it can be accessed on any system at any place of world. During our research, we noticed that almost every other available online platform is paid. This made us think that we can publish this MATLAB App as a web app that will be accessed for free.

2) Building Virtual Lab for Communication System

While doing our research, we decided to look upon virtual lab platform available online. The picture shown below is a snapshot of one the experiment available there in the Signal and system domain. We are unable to find any such platform for communication system subject.

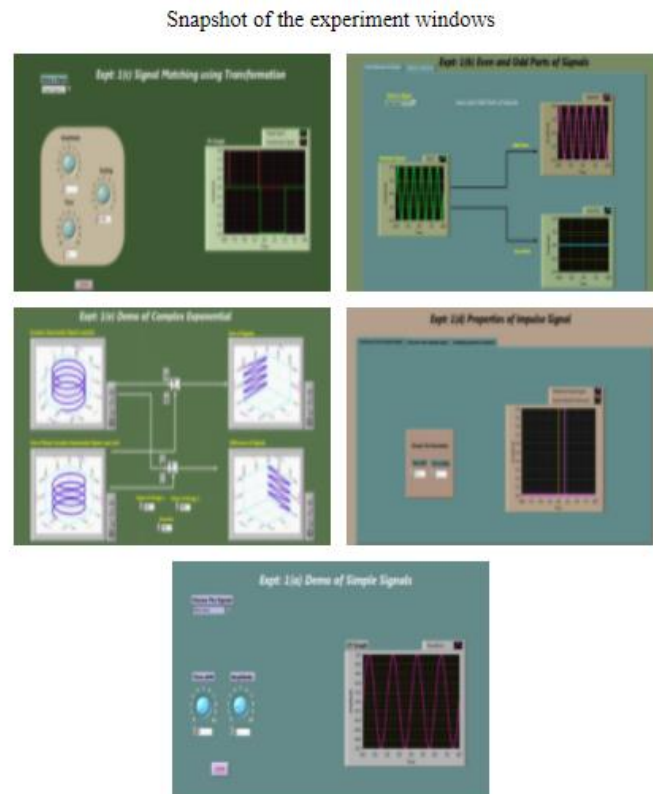


Figure 15 - Interface of Signal and system virtual lab by IIT Guhwati

We noticed many problems in their virtual lab which we are going to highlight.

1) Bad Interface –

We noticed that their virtual lab doesn't have a good interface available at the frontend. If we compare this with our frontend we took care of both theory and simulation purpose at the same window which makes it more compatible for teaching purpose.

2) Simulation –

We were unable to simulate the experiment as it requires different application to be downloaded at the user end which we don't found good as a user. Even when tries to download the same application we were unable to do the same as it says that available application is not compatible or requires 2009 version that is outdated.

References:

1. **Survey Form link:**
https://docs.google.com/forms/d/e/1FAIpQLSeyNq2B8ust3MTd3_zl8tGE6LFsDOM5TtAYWvXhovRI6sDv5A/viewform
2. **Gradeup:**
<https://gradeup.co/courses/vision-2022-ec-b7>
3. Unacademy:
<https://unacademy.com/lesson/overview-analog-communication-system/XRMQR971>
4. MATLAB Academy:
<https://matlabacademy.mathworks.com/>
5. MATLAB App Designer:
<https://www.mathworks.com/products/matlab/app-designer.html>
6. MATLAB Compiler:
<https://www.mathworks.com/products/compiler.html>
7. MATLAB Web App
<https://www.mathworks.com/products/compiler.html#web-apps>
8. Introduction to Analog & Digital Communication, Simon Haykin:
<https://gctjaipur.files.wordpress.com/2015/08/an-introduction-to-analog-and-digital-communications-2nd-edition.pdf>
9. Communication System, John K. Proakis:
[https://www.u-cursos.cl/usuario/9553d43f5ccbf1cca06cc02562b4005e/mi_blog/r/\(2001_Prentice-Hall\)Communication_Systems_Engineering\(2nd_Edition\)_cropped.pdf](https://www.u-cursos.cl/usuario/9553d43f5ccbf1cca06cc02562b4005e/mi_blog/r/(2001_Prentice-Hall)Communication_Systems_Engineering(2nd_Edition)_cropped.pdf)
10. Principle of communication system-I , Prof. Aditya K. Jagannatham
<https://www.youtube.com/playlist?list=PLq-Gm0yRYwTgX2FkPVcY6io003-tZd8Ru>
11. Analog Communication – Vaishali E'Learning
<https://youtube.com/playlist?list=PLXnsjPD8-xuvuHKopadw0omnXZXKFTXkx>