**Faculty Member: Date:** .

**Semester: Section:** .

**EE-351 Communication Systems**

**Lab 10:**  **PHASE MODULTION WITH MATLAB**

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|  |  | **PLO4-CLO4** | | **PLO5-CLO5** | **PLO8-CLO6** | **PLO9-CLO7** |
| **Name** | **Reg. No** | **Viva / Quiz / Lab Performance** | **Analysis of data in Lab Report** | **Modern Tool Usage** | **Ethics and Safety** | **Individual and Team Work** |
|  |  | **5 Marks** | **5 Marks** | **5 Marks** | **5 Marks** | **5 Marks** |
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**Lab 10: PHASE MODULATION**

**Objectives**

To Understand the concept of phase modulation with the help of MATLAB and observe its results.

**Lab Instructions**

* The students should perform and demonstrate each lab task separately for stepwise evaluation
* Each group shall submit lab report on LMS within 6 days after lab is conducted. Lab report submitted via email will not be graded.
* Students are however encouraged to practice on their own in spare time for enhancing their skills.
* Complete as many problems as you can within the allotted time.
* Talk to your classmates for help

**Lab Report Instructions**

All questions should be answered precisely to get maximum credit. Lab report must ensure following items:

* Lab objective
* Results (screen shots) duly commented and discussed.
* Conclusion

**Introduction:**

This lab is a continuation of previous lab where we implemented FM modulation. This time we will implement PM modulation. We will generate phase modulated wave using MATLAB.

The message signal, such as an audio signal that is used for modulating the carrier, is m(t), and has a frequency fm, much lower than fc:

𝑚(𝑡) = 𝐴𝑚cos (2𝜋𝑓𝑚𝑡)

The carrier wave (sine wave) of frequency fc and amplitude A is expressed by

𝑐(𝑡) = 𝐴𝑐cos (2𝜋𝑓𝑐 𝑡)

The expression of modulated signal y(t), can be written as,

𝑦(𝑡) = 𝐴𝑐cos (2𝜋𝑓𝑐 𝑡 + *kf \*Am*\* cos (2𝜋𝑓𝑚𝑡))

**Tasks**

1. **Generate a PM wave with message signal as 𝐴𝑚cos (2𝜋𝑓𝑚𝑡) and carrier as 𝐴𝑐cos (2𝜋𝑓𝑐 𝑡) where:**

**Am=1**

**Ac=1**

**Fm=2**

**Fc=10**

**t=0:0.001:1**

**fs=100**

**Make Observations of waveform with sensitivity =2, pi and pi/2 using MATLAB Code.**

1. **Generate PM wave with message *as 𝐴m square (2𝜋𝑓m 𝑡)* and carrier 𝐴𝑐cos (2𝜋𝑓𝑐 𝑡)**

**With above mentioned values.**

1. **Use MATLAB function pmmod and pmdemod to perform modulation and demodulation with values**

**t=0:0.001:1**

**Fc=10**

**Fm=2**

**Kp=pi/2**

**fs=100**

1. **Define Angle Modulation and Modulation Index?**