



Circuit Simulation Project

Amplitude Modulation and Demodulation using eSim

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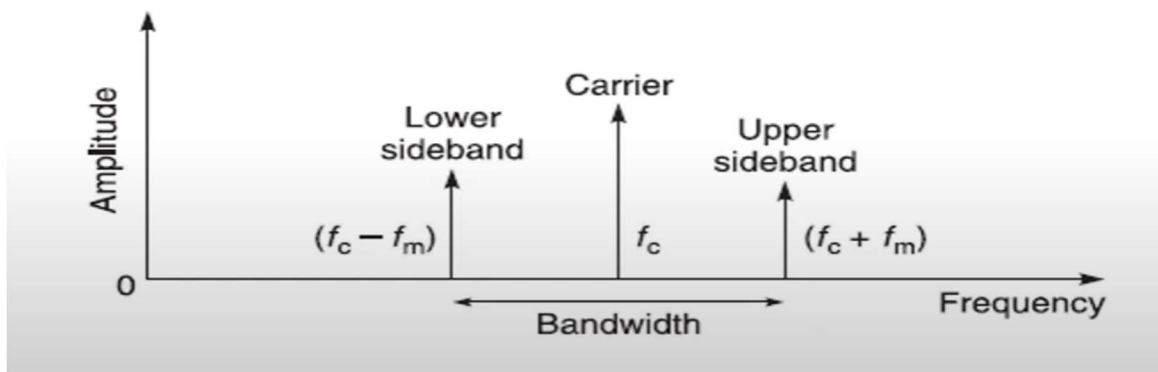
University: Shivaji University

Title of circuit: Amplitude Modulation and Demodulation using eSim

• Problem Statement:

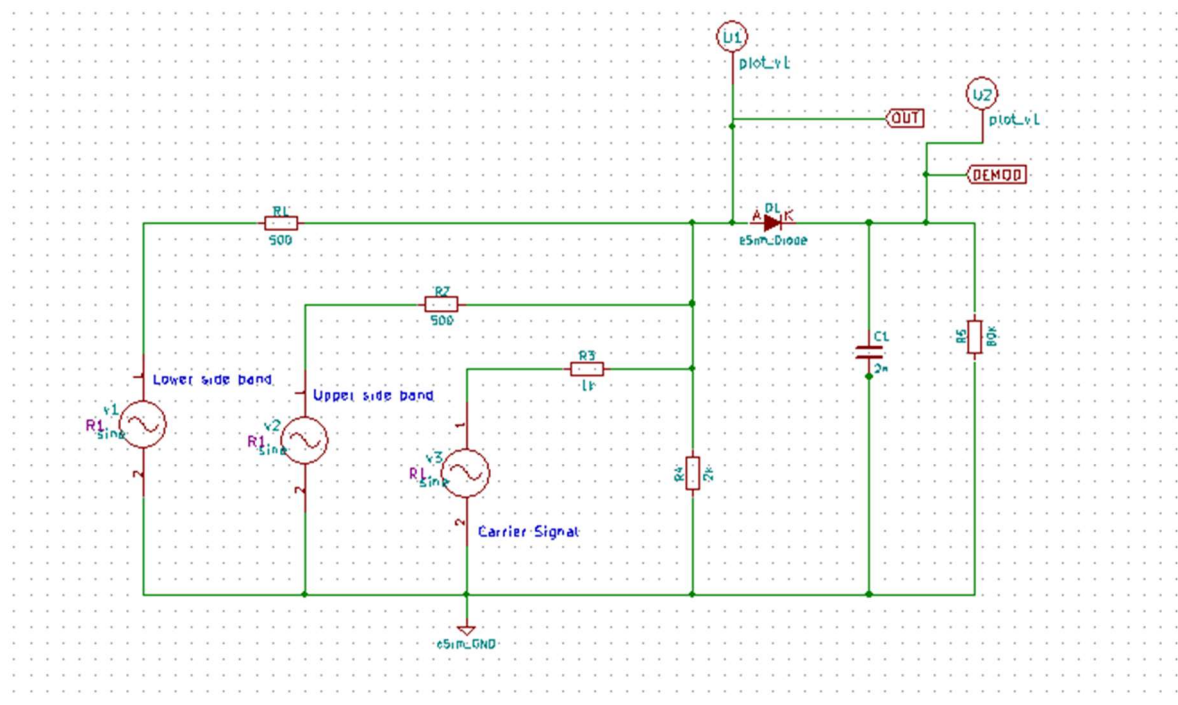
The objective of this project is to design and simulate amplitude modulation (AM) and demodulation circuits using the eSim software environment. The goal is to develop a robust model to demonstrate the fundamental concepts of AM and its recovery (demodulation) with clarity and precision, suitable for educational and experimental purposes. The project will provide a cost-effective and accessible alternative to hardware implementation, leveraging the capabilities of eSim, an open-source EDA tool.

• Theory:



For this we have to understand a basic concept that whatever amplitude modulated signal is there, we get three frequencies in its spectrum, one frequency is f_c , so what is our carrier frequency, and we get two other frequencies, the frequency of lower side upper side band. upper side band is the difference of your carrier frequency plus message frequency. we have taken the signal source, plus if we have resumed that our message frequency as 100kHz, then we will have to take a signal source for an upper side band because $100 + 1 = 101\text{kHz}$. Similarly, we will have to take a lower side frequency, so what will be ours, $100 - 1 = 99\text{ kHz}$ one thing we have to keep in mind is that we have to keep the amplitude of the carrier signal more than the amplitude of these two side bands, only then your modulation will be normal.

• **Circuit Diagram:**



• **Source/Reference(s):**

- **Title of the paper:** Simulink Implementation of Amplitude Modulation Technique using Matlab
- **Name of publication:** International Research Journal of Engineering and Technology (IRJET)
- **Authors:** Mr. Ranjeet R. Suryawanshi, Mr. Vikas D. Patil
- **Pages, Published in:** Volume 5, Issue 8, August 2018, Pages 185-189
- **Link:** [Simulink Implementation of Amplitude Modulation Technique using Matlab](https://www.researchgate.net/publication/362538048)

- Laskov, L. B., & Georgieva, V. M. (2021, June 16). Analysis of Amplitude Modulation and Demodulation in MATLAB Simulink Environment.

<https://doi.org/10.1109/icest52640.2021.9483470>