Report on Guest Lecture: Large Signal Amplifiers and Their Applications

Date: April 25, 2025
Venue: Online via MS Teams
Join Link: https://tinyurl.com/mrdaary3
Organized by: Department of ECE, Sri Sairam Engineering College
Speaker: Dr. S.Sangeetha, Assistant Professor/ECE,CEG Campus

A guest lecture on **"Large Signal Amplifiers and Their Applications"** was organized by the Department of ECE, Sri Sairam Engineering College on 25th April 2025 from 7pm to 8pm through Microsoft Teams Platform. The session was conducted by Dr.S.Sangeetha, Assistant Professor/ECE, an expert in the field of electronic circuit design and power amplification systems.

The lecture aimed to enhance students' understanding of large signal amplifiers, which are crucial components in power electronics and communication systems. The speaker began by explaining the fundamental differences between small signal and large signal amplifiers, focusing on their design principles, operating regions, and practical constraints.

Key topics covered during the lecture included:

- **Introduction to Large Signal Amplifiers**
  - Definition and characteristics
  - Classification: Class A, B, AB, and Class C amplifiers
- **Design Considerations**
  - Load line analysis
  - Thermal management and efficiency
  - Distortion and linearity trade-offs
- **Applications**
  - Audio power amplifiers
  - Radio frequency (RF) transmitters
  - Industrial control systems
  - Wireless communication systems

The speaker illustrated each concept with real-world examples and simulations, which helped bridge the gap between theory and practice. Students were particularly engaged during the Q&A session, where topics like harmonic distortion and efficiency in high-power amplifiers were discussed in depth.

The session was highly informative and received positive feedback from students. It significantly contributed to the practical understanding of amplifier technologies and inspired interest in advanced electronic circuit design.

EVENT ID: SEC202504IEEEIES02

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Guest Lecture on

Large Signal amplifiers and it's applications

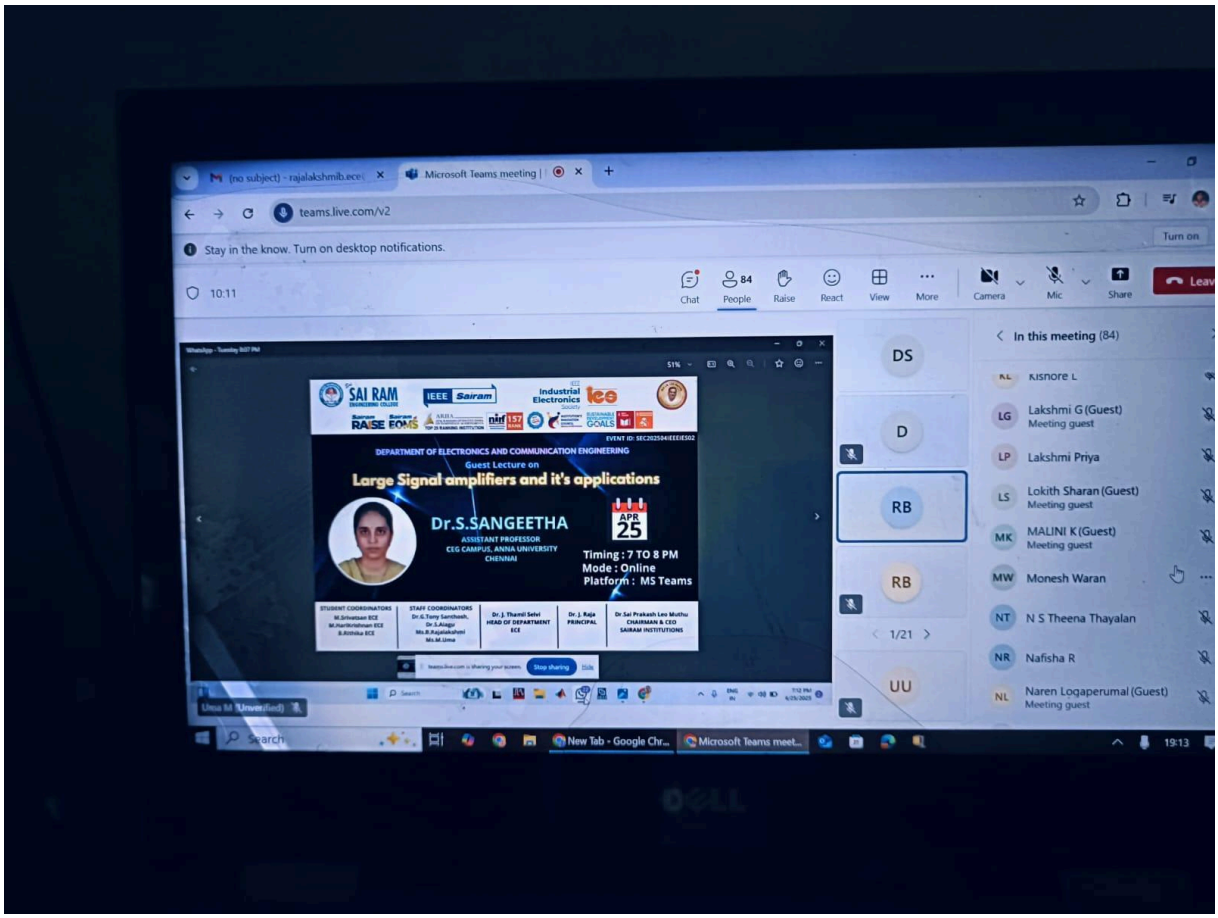
Dr.S.SANGEETHA

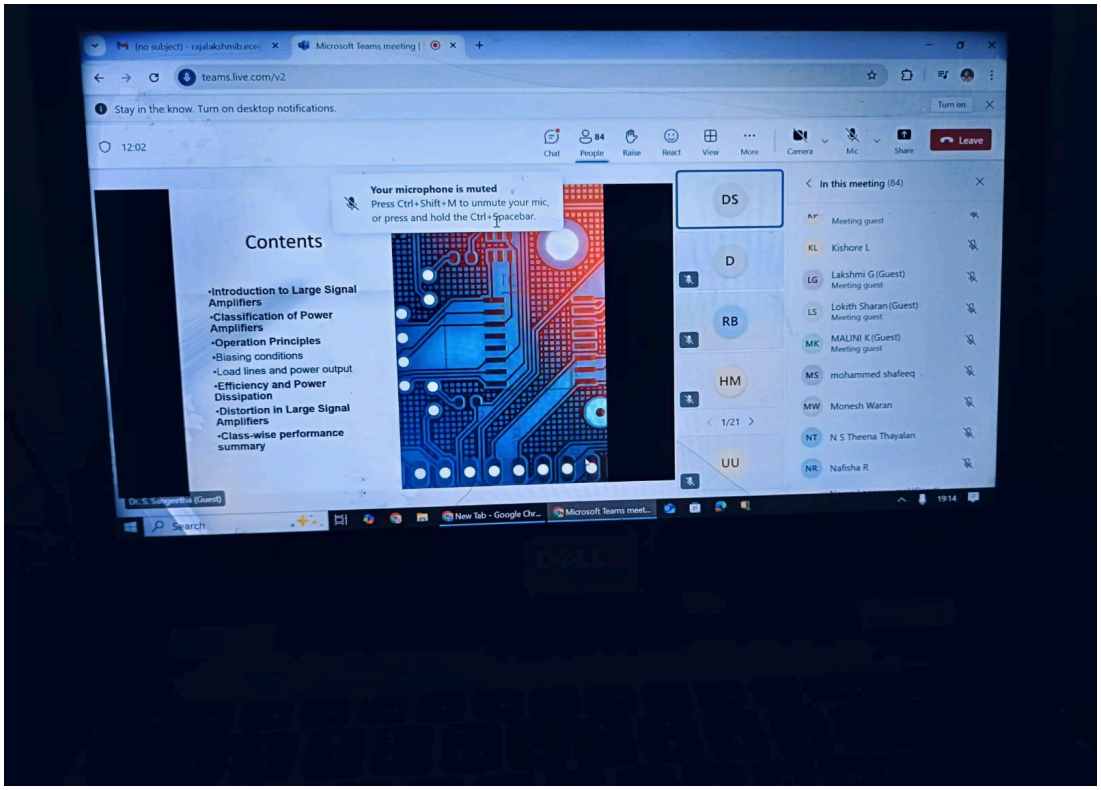
ASSISTANT PROFESSOR
CEG CAMPUS, ANNA UNIVERSITY
CHENNAI

APR 25

Timing : 7 TO 8 PM
Mode : Online
Platform : MS Teams

STUDENT COORDINATORS	STAFF COORDINATORS			
M.Srivatsan ECE M.HariKrishnan ECE B.Rithika ECE	Dr.G.Tony Santhosh, Dr.S.Alagu Ms.B.Rajalakshmi Ms.M.Uma	Dr. J. Thamil Selvi HEAD OF DEPARTMENT ECE	Dr. J. Raja PRINCIPAL	Dr.Sai Prakash Leo Muthu CHAIRMAN & CEO SAIRAM INSTITUTIONS




Microsoft Teams meeting
teams.live.com/v2
Stay in the know. Turn on desktop notifications.
12:02
Chat
People
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React
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Leave
Your microphone is muted
Press Ctrl+Shift+M to unmute your mic, or press and hold the Ctrl+Spacebar.
Contents
•Introduction to Large Signal Amplifiers
•Classification of Power Amplifiers
•Operation Principles
•Biasing conditions
•Load lines and power output
•Efficiency and Power Dissipation
•Distortion in Large Signal Amplifiers
•Class-wise performance summary
In this meeting (84)
Meeting guest
Kishore L
Lakshmi G (Guest)
Lokith Sharan (Guest)
MALINI K (Guest)
mohammed shafeeq
Monesh Waran
N S Theena Thayalan
Nafisha R
DS
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RB
HM
UU
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Dr. S. Sangeetha (Guest)
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Microsoft Teams meet...
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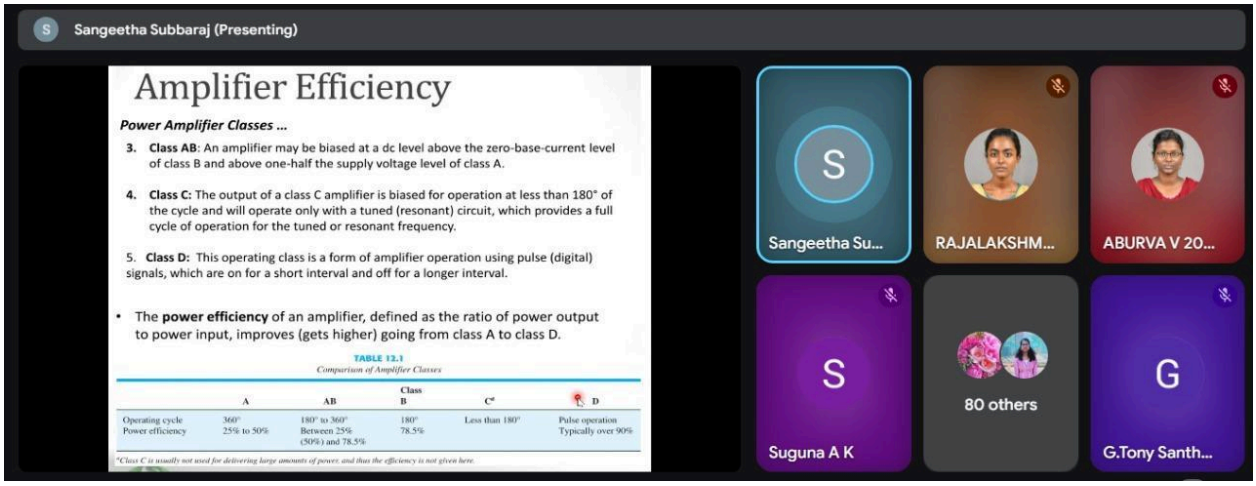
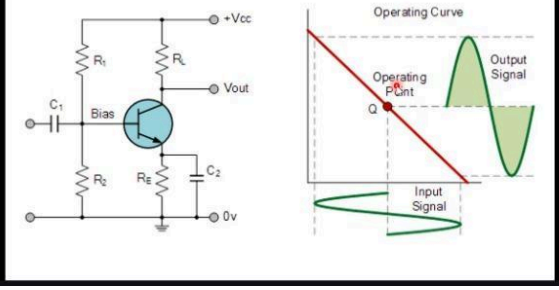

Sangeetha Subbaraj (Presenting)
Amplifier Efficiency
Power Amplifier Classes ...
3. Class AB: An amplifier may be biased at a dc level above the zero-base-current level of class B and above one-half the supply voltage level of class A.
4. Class C: The output of a class C amplifier is biased for operation at less than 180° of the cycle and will operate only with a tuned (resonant) circuit, which provides a full cycle of operation for the tuned or resonant frequency.
5. Class D: This operating class is a form of amplifier operation using pulse (digital) signals, which are on for a short interval and off for a longer interval.
• The power efficiency of an amplifier, defined as the ratio of power output to power input, improves (gets higher) going from class A to class D.
TABLE 12.1
Comparison of Amplifier Classes
Class
A
AB
B
C*
D
Operating cycle
Power efficiency
360°
25% to 50%
180° to 360°
Between 25% (50%) and 78.5%
180°
78.5%
Less than 180°
Pulse operation
Typically over 90%
*Class C is usually not used for delivering large amounts of power, and thus the efficiency is not given here.
Sangeetha Su...
RAJALAKSHM...
ABURVA V 20...
Suguna A K
80 others
G.Tony Santh...

Sangeetha Subbaraj (Presenting)

Class A Amplifier



Sangeetha Su... | RAJALAKSHM... | ABURVA V 20...
Suguna A K | 79 others | G.Tony Santh...

Sangeetha Subbaraj (Presenting)

Power Considerations

- The power drawn from the supply is $P_i(\text{dc}) = V_{CC} I_{C_Q}$
- Output Power

$P_o(\text{ac}) = V_{CE}(\text{rms}) I_C(\text{rms})$

$P_o(\text{ac}) = I_C^2(\text{rms}) R_C$

$P_o(\text{ac}) = \frac{V_C^2(\text{rms})}{R_C}$

- Efficiency

$$\% \eta = \frac{P_o(\text{ac})}{P_i(\text{dc})} \times 100\%$$

- Maximum Efficiency

maximum $V_{CE}(\text{p-p}) = V_{CC}$

maximum $I_C(\text{p-p}) = \frac{V_{CC}}{R_C}$

maximum $P_o(\text{ac}) = \frac{V_{CC}(V_{CC}/R_C)}{8} = \frac{V_{CC}^2}{8R_C}$

maximum $P_i(\text{dc}) = V_{CC}(\text{maximum } I_C) = V_{CC}\frac{V_{CC}/R_C}{2} = \frac{V_{CC}^2}{2R_C}$

The maximum power input can be calculated using the dc bias current set to one-half the

maximum $\% \eta = \frac{\text{maximum } P_o(\text{ac})}{\text{maximum } P_i(\text{dc})} \times 100\% = \frac{V_{CC}^2/8R_C}{V_{CC}^2/2R_C} \times 100\% = 25\%$

N.B.: $V_{\text{rms}} = \frac{V_p}{\sqrt{2}}$

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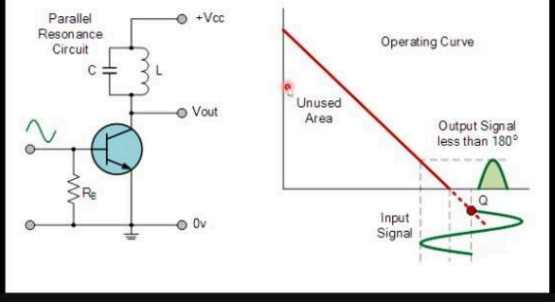
Suguna A K | 85 others | G.Tony Santh...

Sangeetha Subbaraj (Presenting)

Class C Amplifier



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VIMAL RAJ A ... | 94 others | G.Tony Santh...

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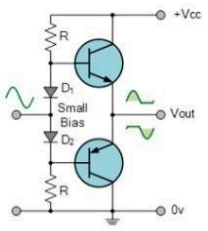
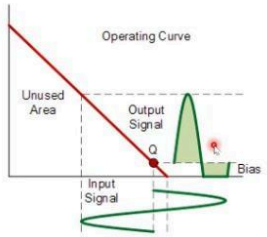
Class AB Amplifier





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Sangeetha Subbaraj (Presenting)

Crossover Distortion

- When the dc base voltage is zero, both transistors are off and the input signal voltage must exceed VBE before a transistor conducts.
- Because of this, there is a time interval between the positive and negative alternations of the input when neither transistor is conducting, as shown in Figure.
- The resulting distortion in the output waveform is called **crossover distortion**.

Sangeetha Su... | RAJALAKSHM... | ABURVA V 20... | VIMAL RAJ A ... | 79 others | G.Tony Santh...

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IEEE Industrial Electronics Society | IEEE STUDENT BRANCH CHAPTER EXPLORE EXPAND ENLIGHTEN

CERTIFICATE

OF APPRECIATION

This certificate is awarded to

Dr.S.Sangeetha

Assistant Professor, ECE, CEG Campus, Anna University Chennai.

For delivering a Guest lecture on **" Large Signal Amplifiers and it's Applications "** on 25.04.2025 conducted by the Department of Electronics and communication Engineering, Sri Sairam Engineering College and SAIRAM IEEE Industrial Electronics Society, Chennai.

Dr. S. Brindha	Dr. J. Thamil Selvi	Dr. J. Raja	Dr. Sai Prakash LeoMuthu
Sairam IEEE Captain SEC IEEE SB Counsellor	HOD/ECE	Principal/SEC	Chairman & CEO, Sairam Institutions

MJF. LN. LEO MUTHU
Founder Chairman - Sairam Institutions

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