



# SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)  
COIMBATORE-35

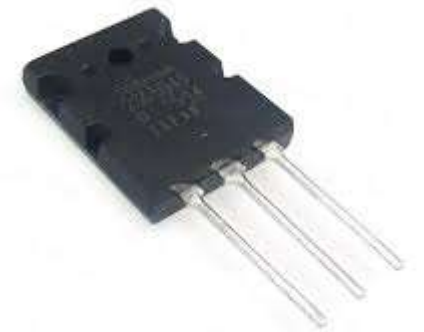
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## 23EET104 / ANALOG ELECTRONICS CIRCUITS I YEAR / II SEMESTER

### UNIT-III: TRANSISTOR AMPLIFIER

## DISTORTION

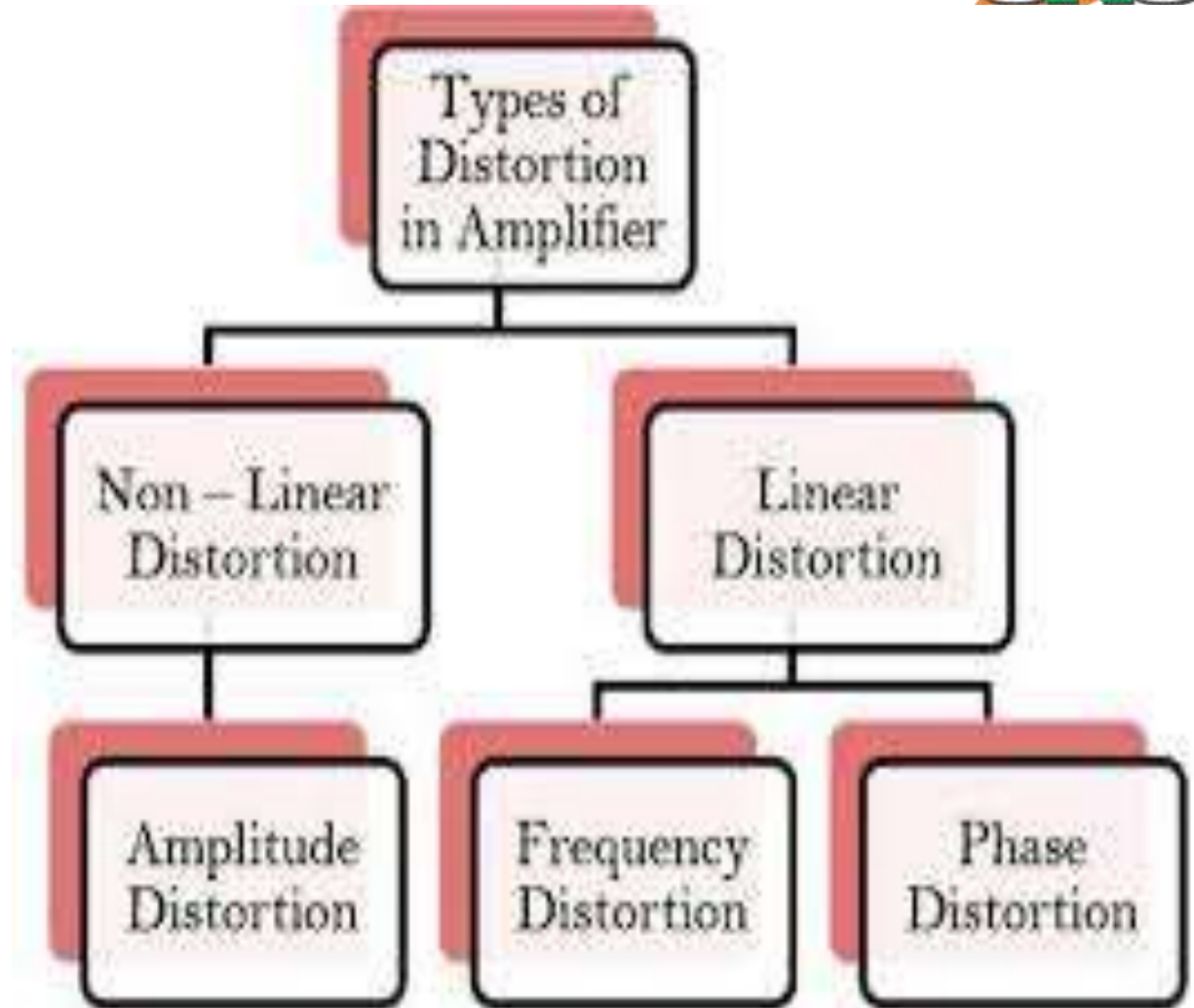




# DISTORTION

- **Distortions in amplifiers**

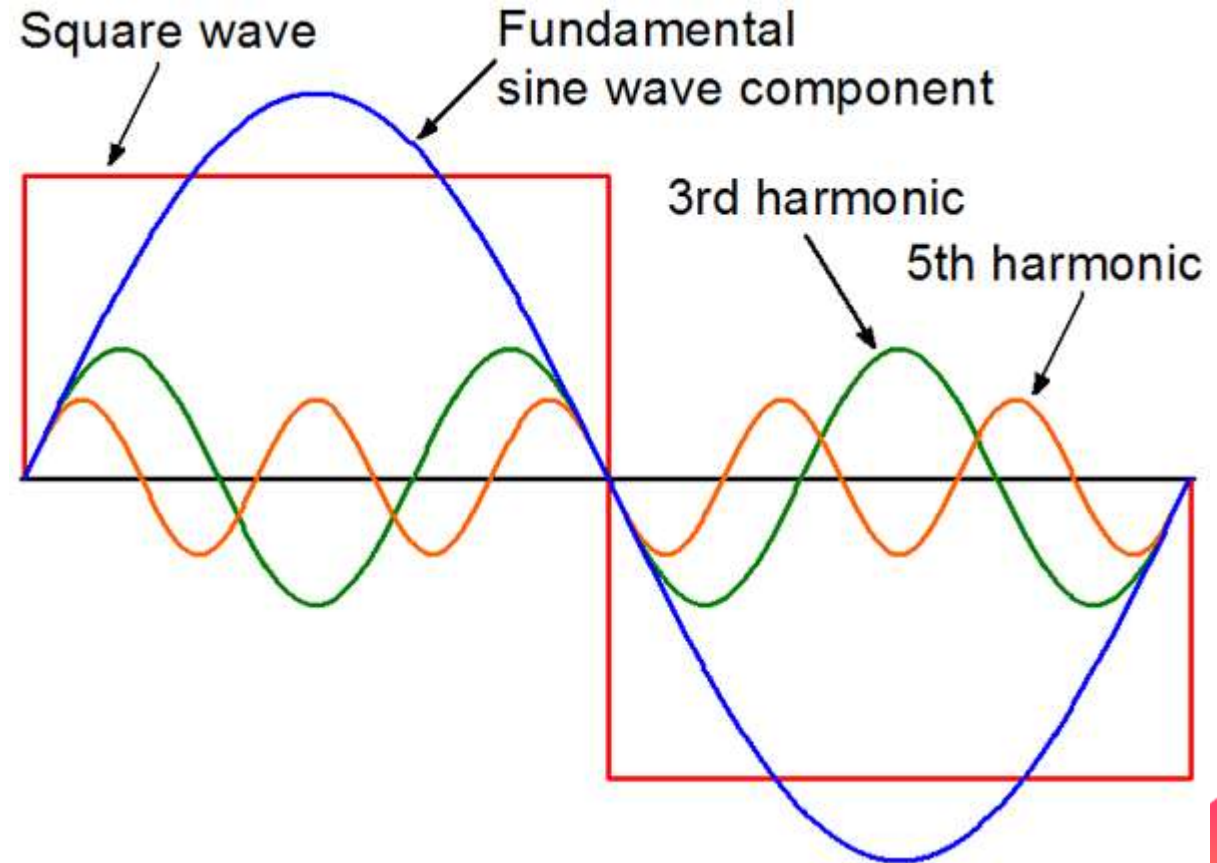
- The output of an amplifier is not a complete sine wave, then it has distortion.
- Distortion occurs due to reframing the fundamental waveform
- It can be analyzed by using Fourier analysis.





# HARMONICS

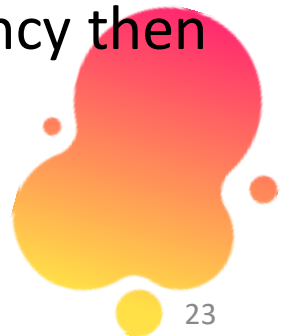
- Harmonics are frequencies that are whole number multiples of the fundamental frequency.
- Harmonics are integer multiples of a fundamental frequency (F). For example, 1st harmonic is  $1 \times F$  kHz.
- **ODD harmonics:** Non-linear loads generate odd harmonics. Generally heats the devices, overload it.
- **EVEN harmonics:** Generally smaller in amplitude, neutralizes, creates less distortion.



# **DISTORTION - Types**



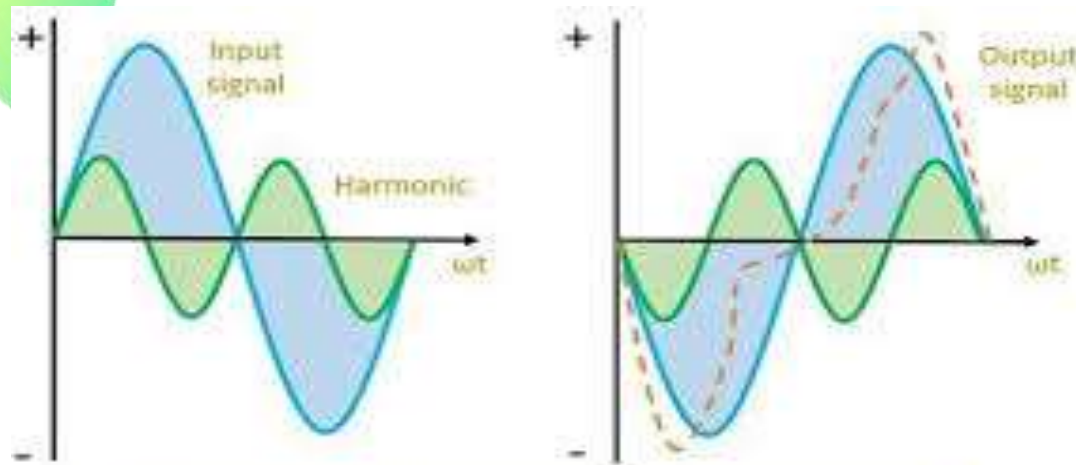
- **Amplitude or Non Linear distortion:**
  - Due to the non-linearity of transistor (nonlinear dynamic characteristics of transistor) the output is different from the input. This kind of distortion is known as amplitude distortion or harmonic or non-linear distortion.
- **Frequency Distortion:**
  - When different frequency components of the input signal are amplified differently frequency amplification takes place. This is mainly due to the internal capacitance effect of the transistors.
- **Delay or Phase shift distortion:**
  - If the phase shift introduced by amplifier is not proportional to the frequency then phase distortion takes place.







# DISTORTION – Types & Remedy



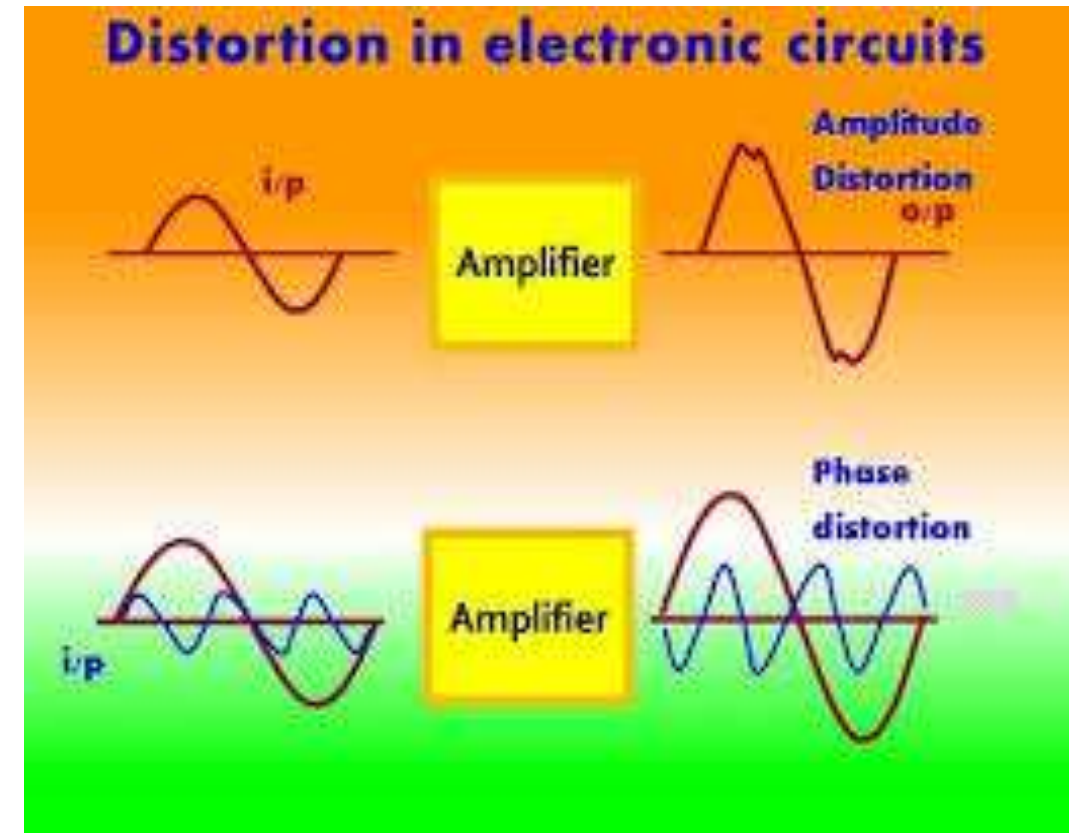
Frequency Distortion due to Harmonics

Electronics/Coach

## Distortion in amplifiers can be rectified

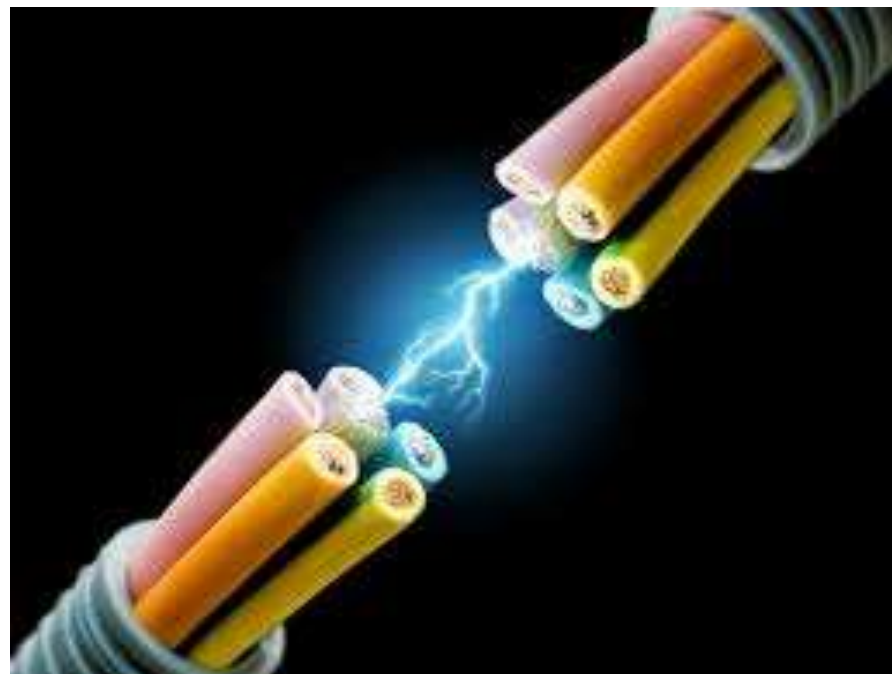
Employing techniques like negative feedback,

- optimizing biasing,
- using high-quality components,
- Using filter circuits





# RECAP....



# ...THANK YOU

