

# PREEMPHASIS AND DEEMPHASIS USING IC 741 OP AMP

## THEORY:

**PRE-EMPHASIS-** In processing electronic audio signals, pre-emphasis refers to a system process designed to increase (within a frequency band) the magnitude of some (usually higher) frequencies with respect to the magnitude of other (usually lower) frequencies in order to improve the overall signal-to-noise ratio by minimizing the adverse effects of such phenomena as attenuation distortion or saturation of recording media in subsequent parts of the system. The mirror operation is called de-emphasis, and the system as a whole is called emphasis.

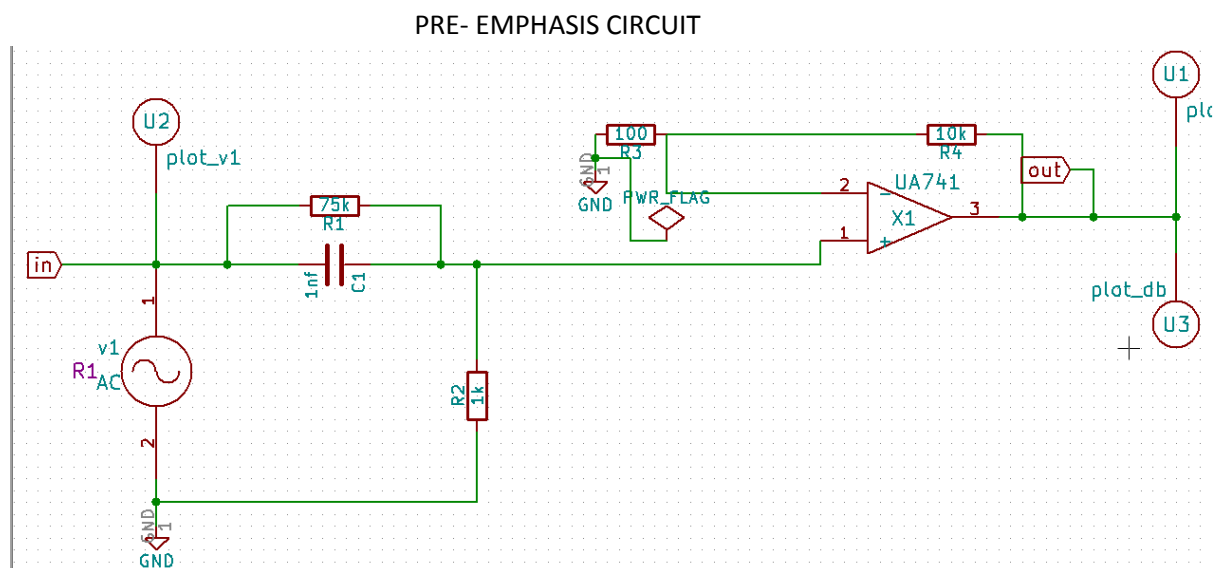
**DE-EMPHASIS-**In telecommunication, **de-emphasis** is the complement of pre-emphasis, in the antinoise system called emphasis. De-emphasis is a system process designed to decrease, (within a band of frequencies), the magnitude of some (usually higher) frequencies with respect to the magnitude of other (usually lower) frequencies in order to improve the overall signal-to-noise ratio by minimizing the adverse effects of such phenomena as attenuation distortion or saturation of recording media in subsequent parts of the system.

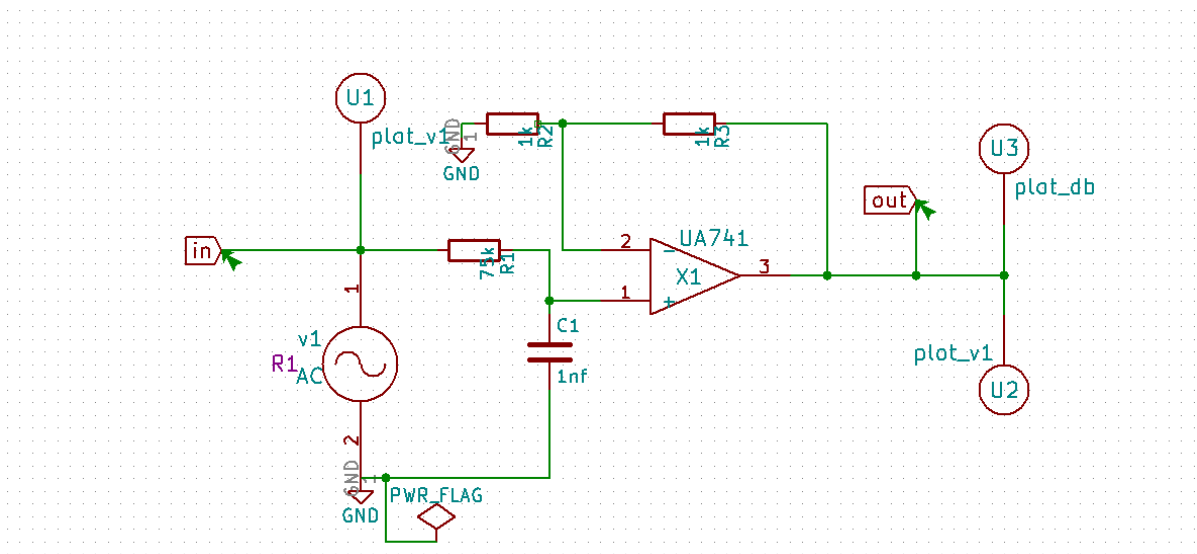
DESIGN:  $RC=75 \mu s$

Select  $C=1\mu F$  , $R=75k$  ohm

$f(\text{cutoff})=2.12\text{kHz}$

SCHEMATIC DIAGRAM:





DE-EMPHASIS CIRCUIT

NgSpice PLOTS:

PRE-EMPHASIS PLOTS

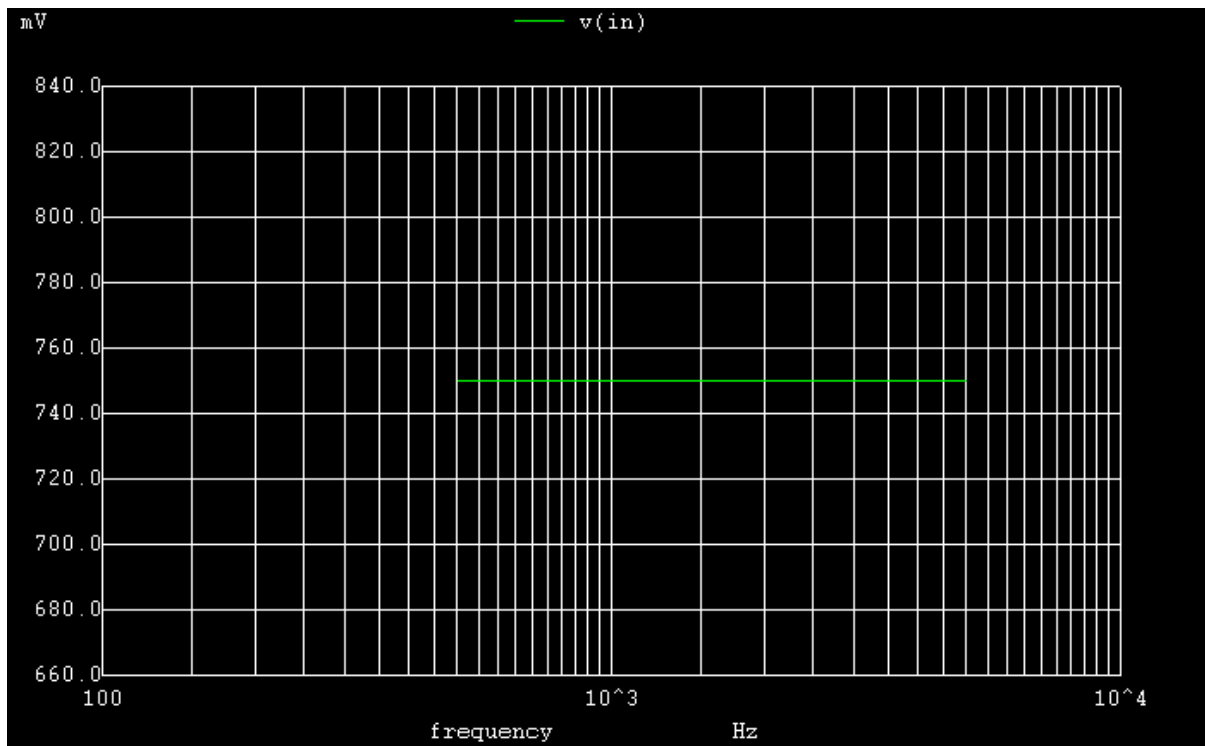


FIG1:NgSpice input plot

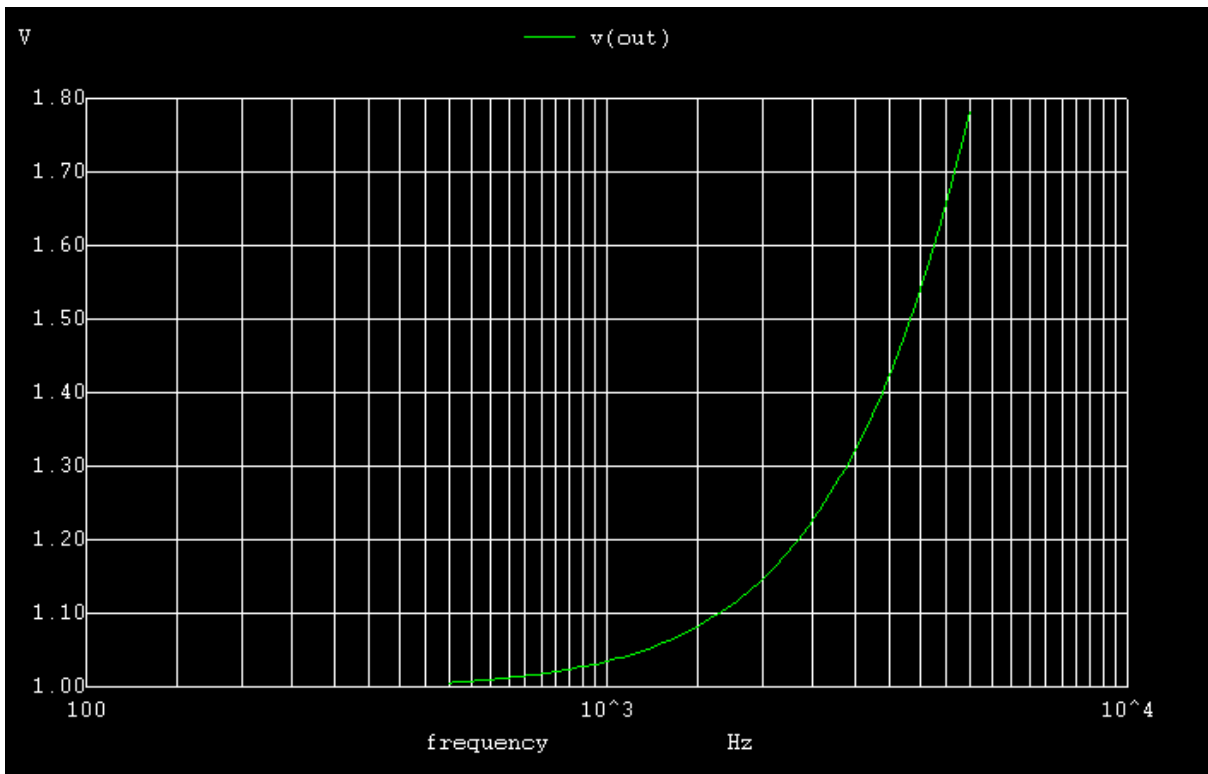


FIG2:NgSpice output plot

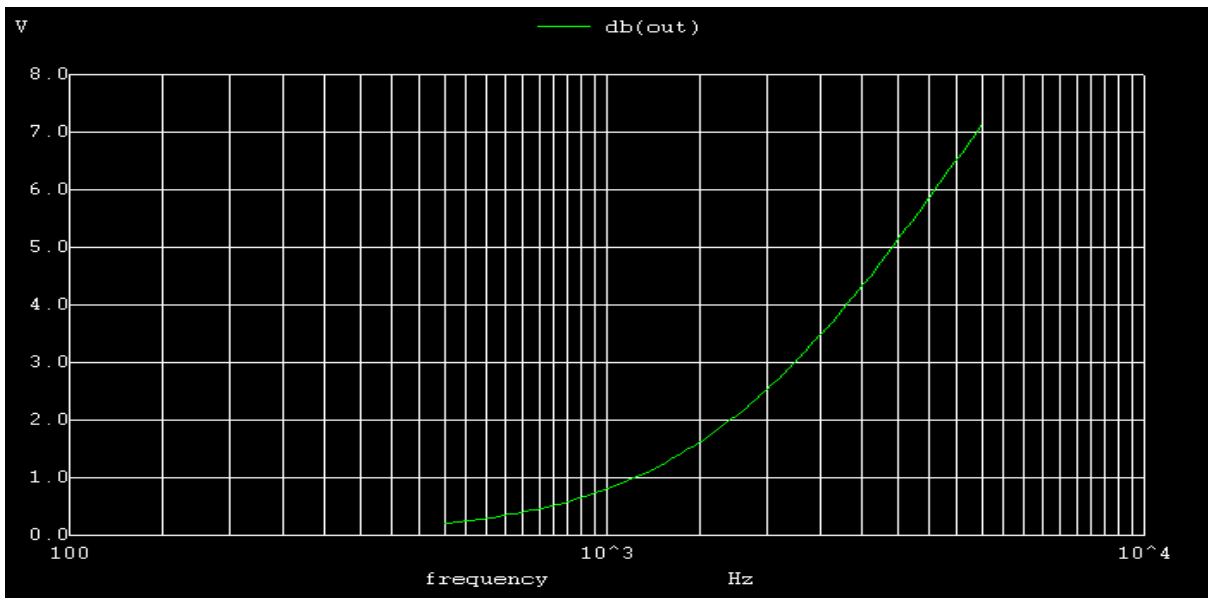


FIG3:NgSpice output(dB) plot

## DE-EMPHASIS PLOTS

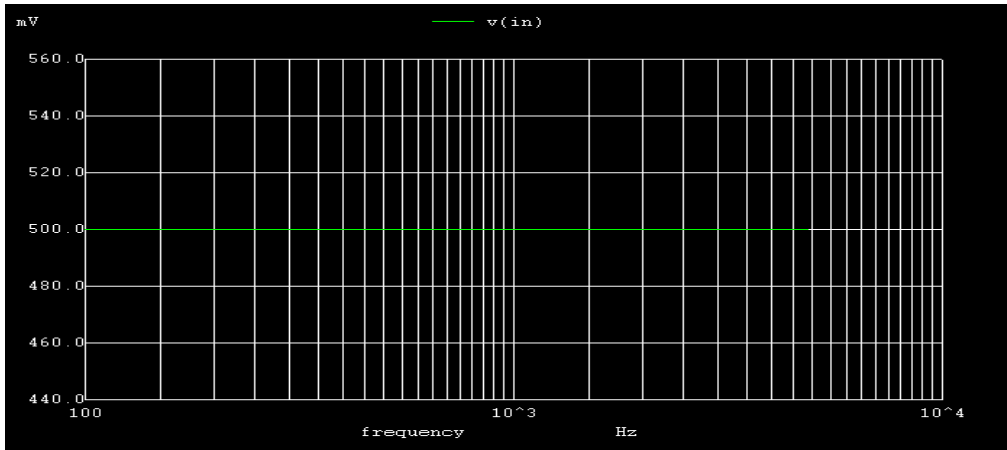


FIG4:NgSpice input plot

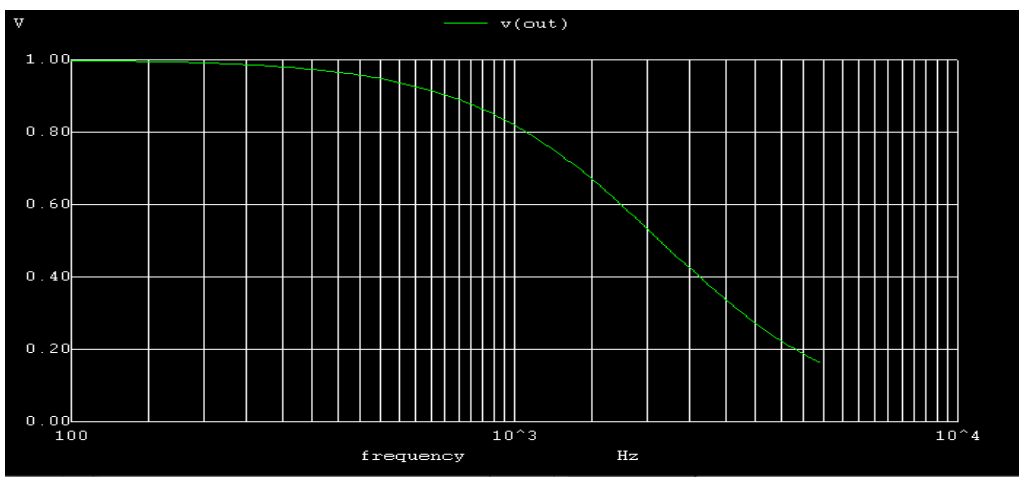


FIG5:NgSpice output plot

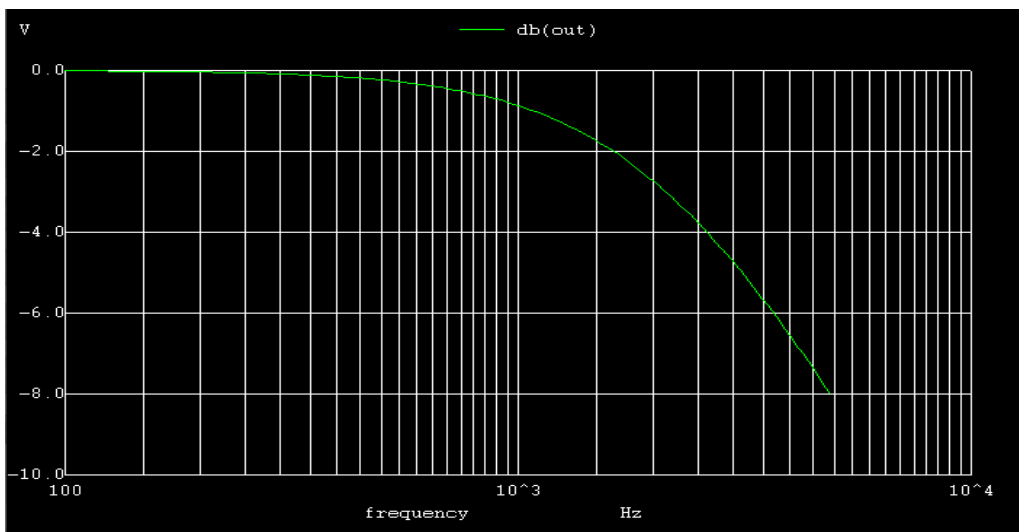
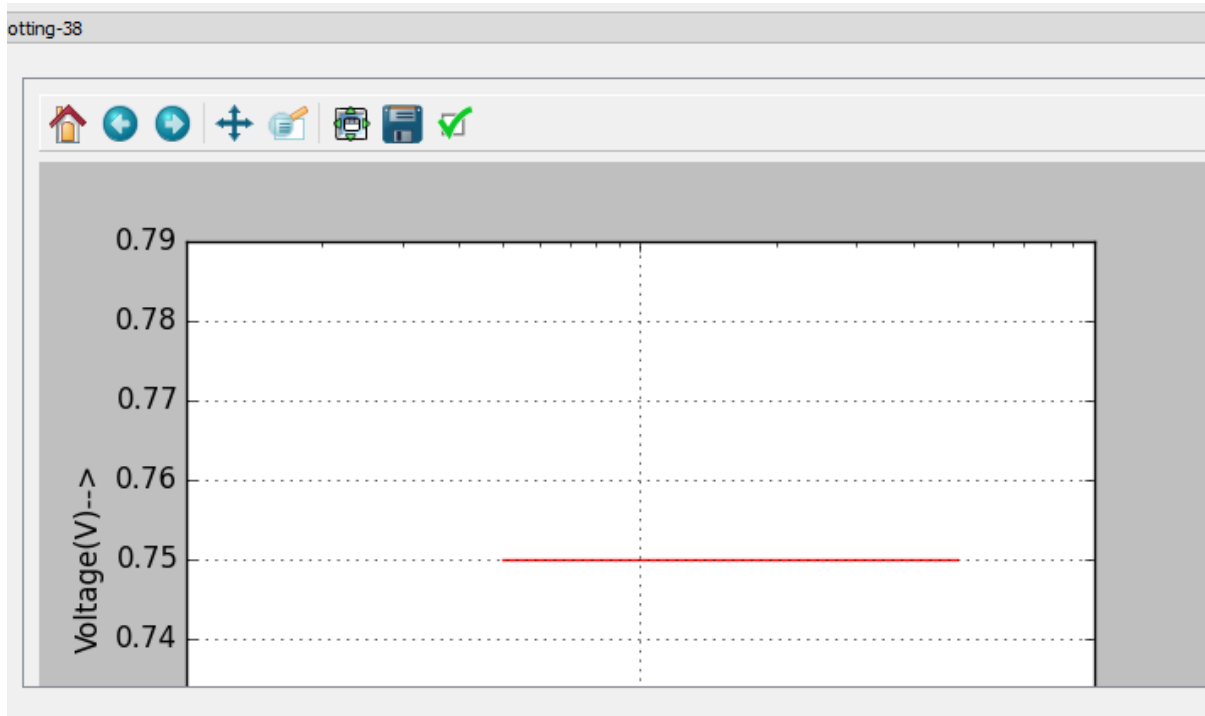


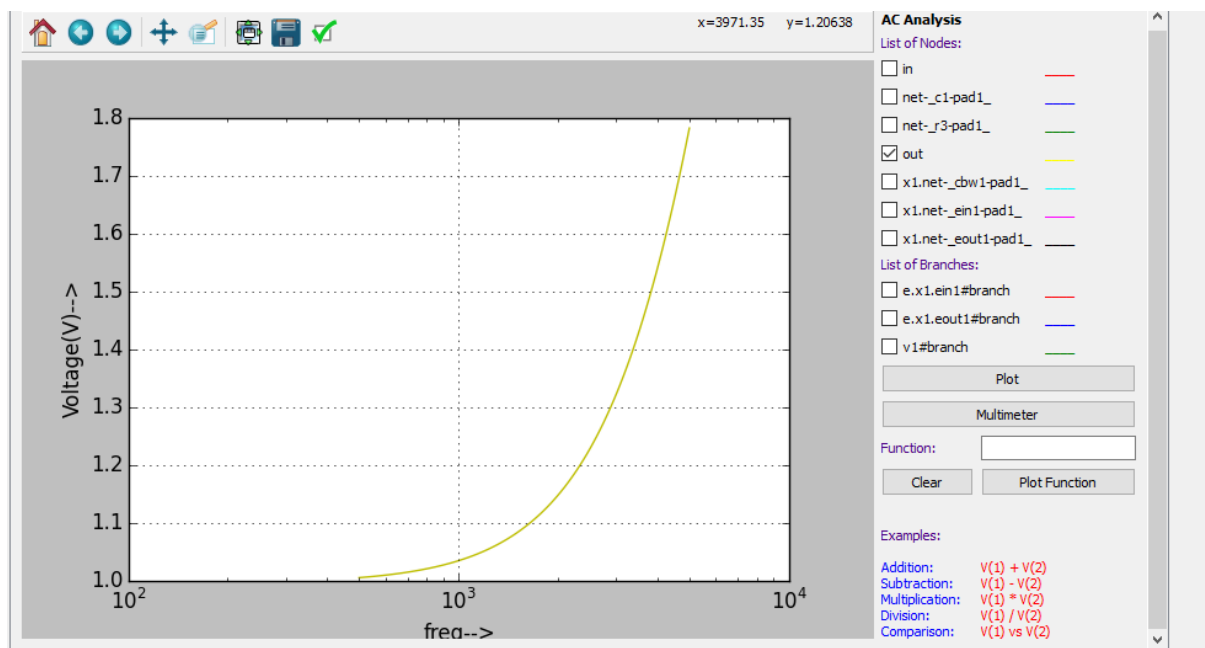
FIG6:NgSpice output(db) plot

# PYTHON PLOTS

## PRE-EMPHASIS

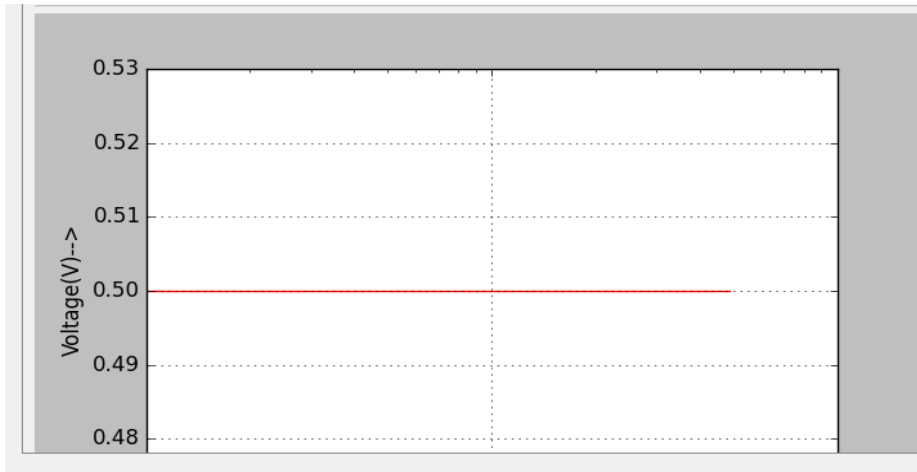


## INPUT PLOT

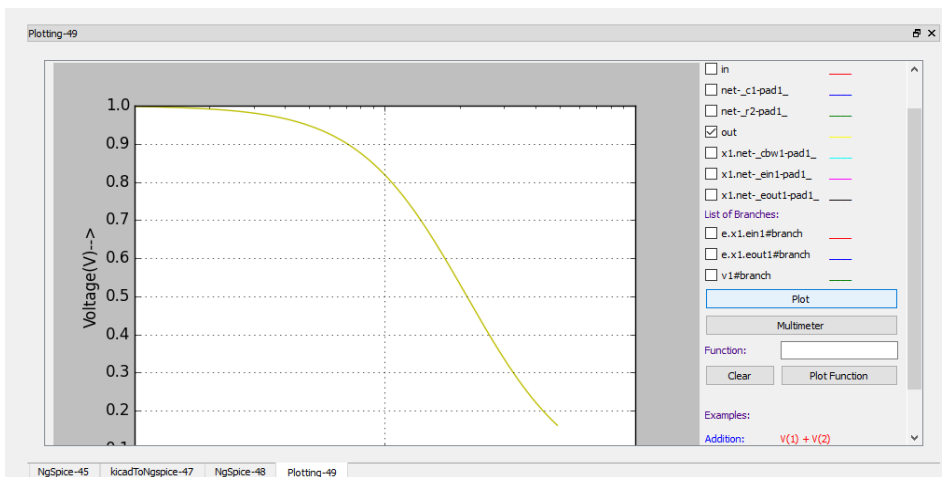


## OUTPUT PLOT

## DE-EMPHASIS



## INPUT PLOT



## OUTPUT PLOT

## REFERENCES:

[https://en.wikipedia.org/wiki/Emphasis\\_\(telecommunications\)](https://en.wikipedia.org/wiki/Emphasis_(telecommunications))

<https://www.daenotes.com/electronics/communication-system/pre-emphasis-and-de-emphasis>