

Function Generator

Ananya N

Institute of Chemical Technology, Mumbai

28th February, 2022

Literature Survey

Abstract

Function generators have versatile applications in electronics. In this work, a function generator has been constructed by cascading three well known circuits – The Wien Bridge Oscillator, Schmitt trigger, Integrator. The Wien Bridge Oscillator has been constructed using JFETs; Schmitt trigger using CMOS transistors; Integrator using the traditional Op Amp. The Wien Bridge Oscillator produces a sine wave that acts as an input to the Schmitt trigger circuit which in turn converts it to a square wave. The square wave is further converted to a triangle wave by the integrator.

Key words: Sine wave, CMOS, JFET, waveform generator

Reference circuit details

Function generators are standard circuits in electronics discipline used to produce different kinds of waveforms (usually sine, square, triangle waves). In an attempt to construct a waveform generator, three standard circuits have been employed. Unlike the standard circuits using Op Amps, two of them have been designed separately using different components. Wien bridge oscillator has been constructed using JFETs and the Schmitt trigger has been constructed using CMOS transistors. Integrator is built using the traditional Op Amp. Each circuit involves separate circuit analysis and formulae to analyze its working. We calculate T_{on} , T_{off} , duty cycle, UTP and LTP.

Reference circuit design

Reference waveforms

References

- Dokic, B. L. (1984, October). CMOS Schmitt triggers. In *IEE Proceedings G-Electronic Circuits and Systems* (Vol. 131, No. 5, pp. 197-202). IET.
- Filanovsky, I. M., & Baltes, H. (1994). CMOS Schmitt trigger design. *IEEE Transactions on Circuits and Systems I: Fundamental Theory and Applications*, 41(1), 46-49.
- Retrieved 28 Feb, 200 from, <http://techpicz.blogspot.com/2012/07/wein-bridge-oscillator-using-jfet.html#.Yh0HMOhBxBp>
- Electronic Principles, Albert Malvino and Bates,