THE ANALYSIS OF A SECOND ORDER BANDPASS FILTER OF A LOW NOISE CMOS INSTRUMENTATION AMPLIFIER USING MENTOR GRAPHICS

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Abstract

This thesis presents a report on my project titled "The Analysis of A Bandpass Filter of A Low Noise CMOS Instrumentation Amplifier Using Mentor Graphics". This project was taken from the IEEE Journal of Solid-State Circuits, Vol. 32, No 7, July 1997[2] where in my experiment; the bandpass filter is a part of the instrumentation amplifier mentioned above. The circuit has its requirement that must be observed. The circuit is first drawn using Mentor Graphics (Design Architecture) where all the rules and regulation for the electrical codes are obeyed. The AccuSim, one of the modules in Mentor Graphics, is used to simulate the circuit. The result is a bandpass filter with a response of a resonant frequency at 5.0873kHz a voltage gain of 25.492 (27.794dB) and a Q-factor of 3.793.

Acknowledgement

In the name of ALLAH the Most Gracious, Most Merciful and HIM alone is worth all praises.

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CHAPTER 1

INTRODUCTION

One of the greatest revolutions of our age is the advent of the silicon chip. It is now possible to produce a die with over a million transistors on it so that total systems can be produced on a single chip. It is not difficult to imagine the changes that this is introducing to the whole society. A part of this revolution is the drastic change in component costs of a system.

A decade or so ago active electronic components and the assembly of them onto a printed wiring board constituted the major cost of the system. By integrating the complete system into a single component, these cost are considerably reduced and are often dwarfed by the costs of the subsidiary components such as plugs, sockets, interconnecting cables, switches and the box to house it all in.

A further advantage of being able to integrate a total system is the improvement of reliability. As a first order approximation, the reliability of a system is proportional to the number of solder or made connections. By integrating a system onto a single chip there is a considerable improvement in reliability. Chip reliability is extremely high with modern clean rooms and stable fabrication processes. Even if a failure should occur, the fault finding and replacement procedure can be minimal, as the system is basically a single chip, which is simply replaced.