

DESIGN AND ANALYSIS THE CMOS GAIN BOOSTING FOR TELESCOPIC AMPLIFIER

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“May Allah bless and reward them for their kindness”

ABSTRACT

This project is to design a CMOS gain booster of telescopic amplifier (GBTA) based on the given specification such as supply voltage equal to +5V, capacitance load equal to 10Pf, DC voltage gain is 5000V (74dB), and low power consumption that equal to 2mW. Some calculations and I-V characteristic analysis have been done to determine the W/L of the CMOS transistor to obtain the result of the specifications based on generic 1.25 μ m technology. PSPICE tools are used to simulate and verify the design. Finally, the schematic of the CMOS gain booster of telescopic are obtained and the functional of the GBTA is tested to the basic differential amplifier.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

1.1.1 Operational Amplifier

In general, an operational amplifier (op-amp) is consisting of a three circuit stage as shown in Figure 1.1:

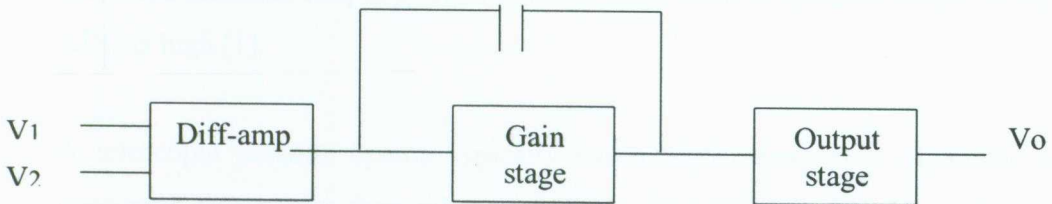


Figure 1.1: General block diagram of an operational amplifier.

The first stage is differential amplifier, the second stage provides additional voltage gain and the third stage provides current gain and low output impedance. A feedback capacitor is included in the second stage to provide frequency compensation. In some MOSFET circuits, only the first two stages are used. For a differential amplifier, current source biasing and loads are considered. Darlington pair is used as a second gain stage and the class AB output stage is used for operational amplifier circuits. Finally, this individual building block will be formed to combine the operational amplifier.

The op-amp is one of the most versatile and important building blocks in many analog and mixed signals systems. Op-amps is an analog system that always in a different level of complexity that is used to realize functions ranging from dc bias generation to high speed amplification or filtering. As the supply voltage and transistor channel length scale down with each generation of complementary