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Analysing and Designing Layout of all current mirrors on Cadence Virtuoso

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Abstract: ***This paper proposes new current mirror layout strategies which are being designed using 180nm technologies using cadence virtuoso layout software. The performances of circuit is also being analysed in L edit window by varying input current and input voltages values or by changing arrangement of N- Type-Mosfet. Simulation results show a significant improvement in matching characteristics of the proposed structures over what is achievable with existing layout techniques in demanding applications.[21]***

Keywords: Current mirror layout strategies, performance linear grading specifications.

I. INTRODUCTION

Current mirrors are special circuits which are being used in IC (integrated circuit) technology. The mirrors circuit generally consists of two transistors while third or other one can consist of FETs which can be used in these types of circuits to enhance performance. Current mirror copies or gains the name because it copies the current flowing in the circuit with output current being constant. Actually we can say that current mirros are types of the current controlled current source circuits. The current mirror is used to provide biasing current and active loads of circuit[22].

II. DIFFERENT CURRENT MIRRORS AND THEIR LAYOUTS

A. Simple Current Mirror

Current Mirrors are subject of innovation and low voltage current mirros are being possible by use of bipolar technology.Simple current mirror is shown in figure which is commonly used and also being well known for it's inaccuracy by having sammer values of β. The ratio of output current I2 to input current I1 of the simple current mirror 2 is given by β, where β is the current gain of the transistors.

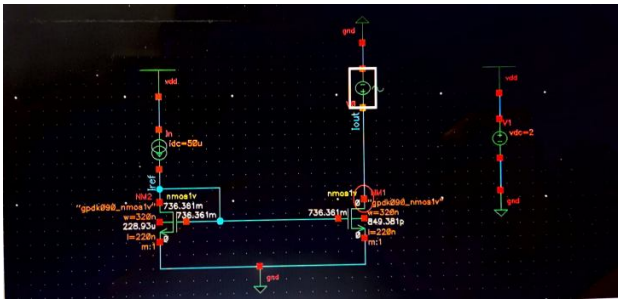


Fig.1 Schematic Diagram of Simple current mirror

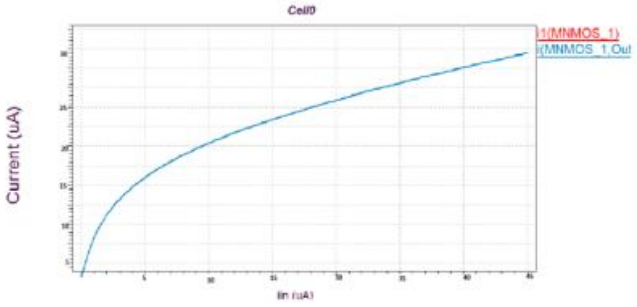


Fig.2 Analysis of Simple current mirror.

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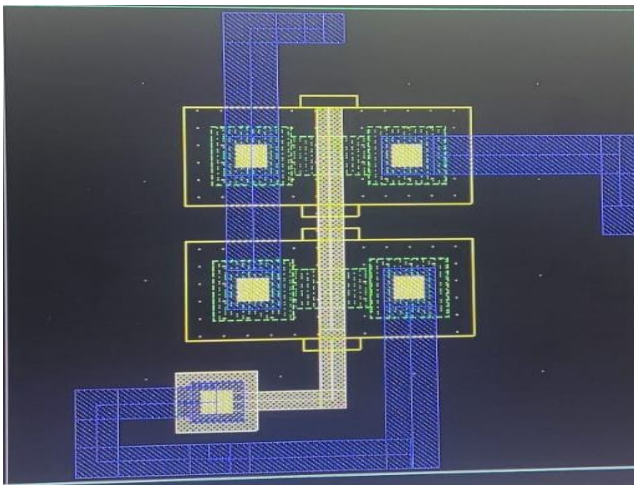


Fig.3 Layout of Simple current mirror.

B. Cascode Current Mirror

There is a cascode current mirror device that can produce an output current that is a direct function of the input current it receives. At least two parts are connected in a cascode fashion in the cascode current mirror. Additionally, a connection for feedback is built between those components. For instance, a buffering connection might be this feedback connection. This device produces voltage signals that can be utilised to drive and regulate further output stages. Such additional output stages have the ability to provide more output current[2].

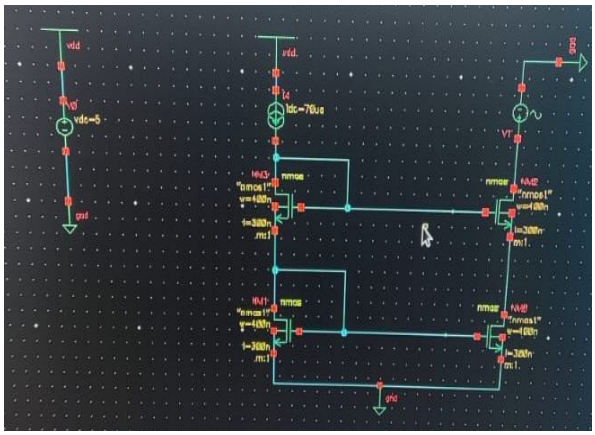


Fig 4. Schematic diagram of cascode current mirror.

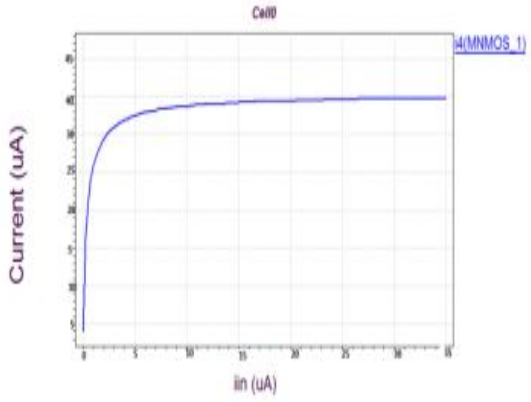


Fig 5. Analysis of cascode current mirror.

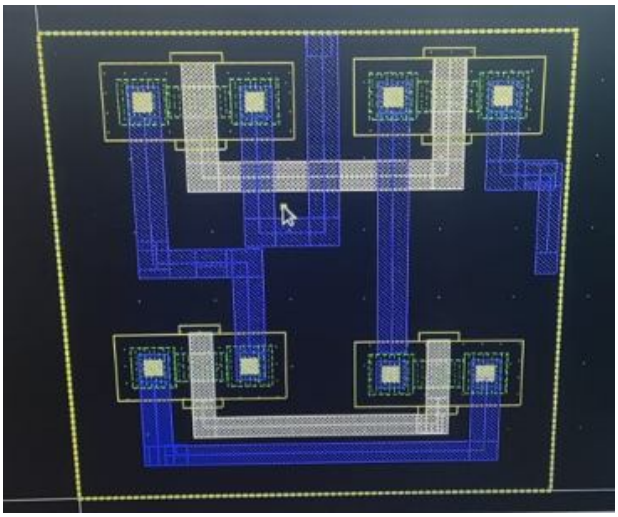


Fig 6. Layout of cascode current mirror.

C. Widlar Current Mirror

It is a modification of simple 2 transistor current mirror that incorporates the emitter degeneration resistor for output transistor with enhanced output and with the better accuracy being obtained in output with no change in value of β[4].

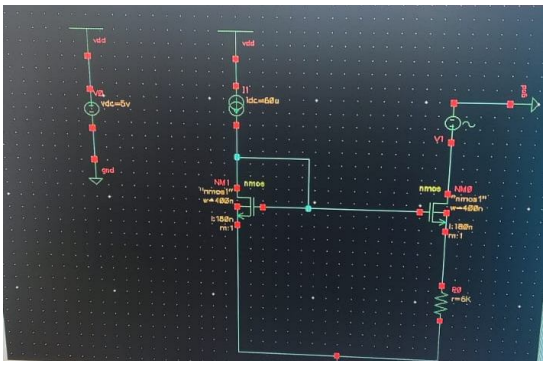


Fig 7. Schematic diagram of widlar current mirror.

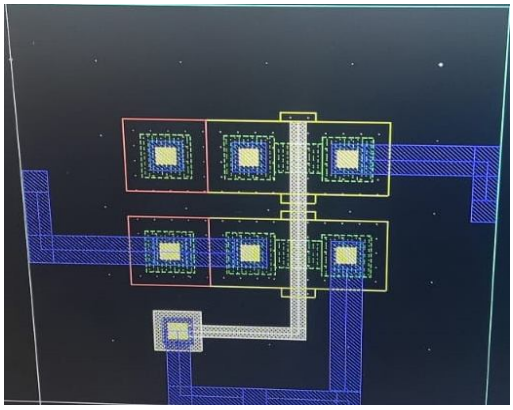


Fig 8. Layout of Widlar Current Mirror.

D. Wilson Current Mirror

In this type of current mirror shunt series negative feedback circuit is being used to improve the performance of circuit between the output impedance of circuit and output current of the circuit.

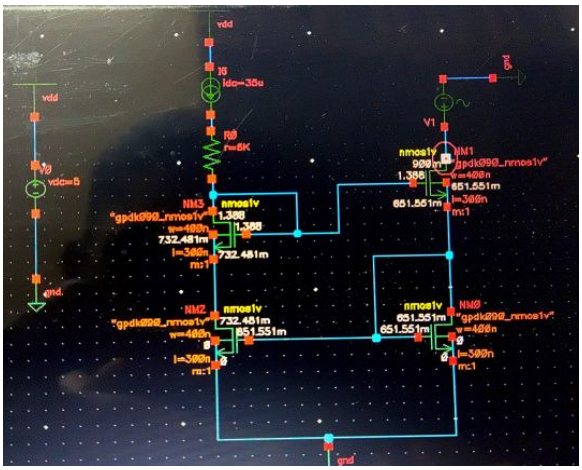


Fig 9. Schematic diagram of wilson current mirror.

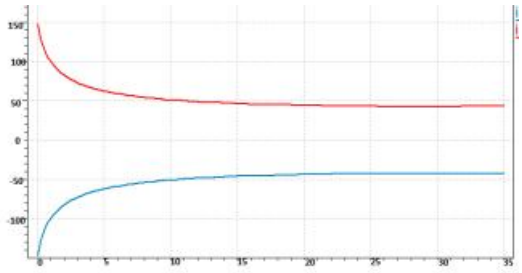


Fig 10. Analysis of Wilson Current Mirror

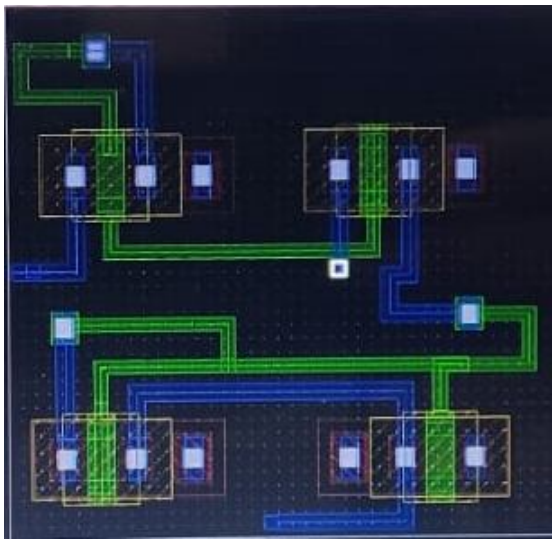


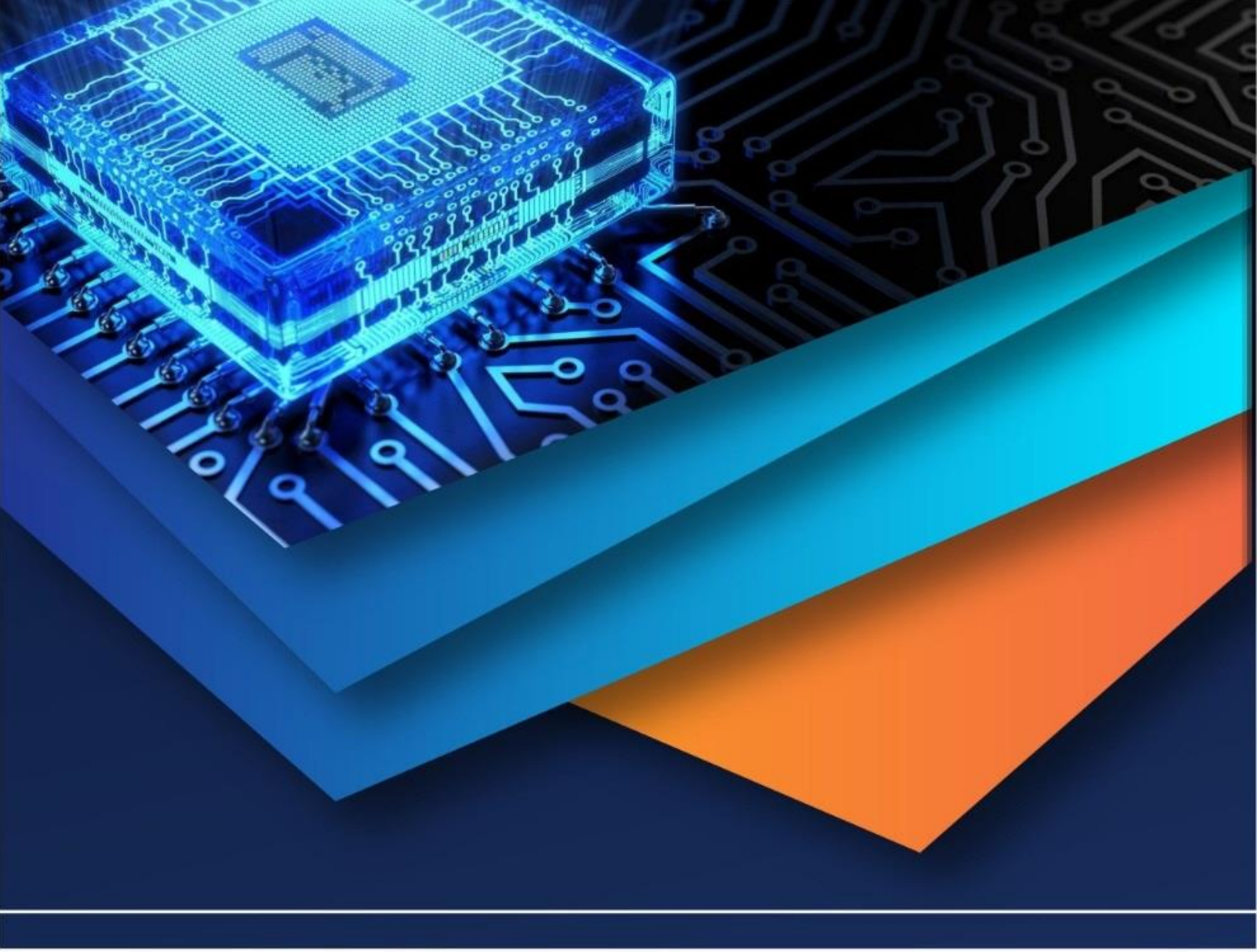
Fig 11.Wilson Current Mirror Layout

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