



RKTG Pair Amplifier with Gain Boosting Stage

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Abstract: In the present investigation we have to study about Raj Kumar Tiwari and Gaya Prasad Pair (RKTG pair) amplifier circuit with gain boosting stage. The proposed circuit work for very low input signal like pulse rate of heart beat with higher gain 727.5435 and wide band frequency range with low cut off frequency 450.8454 KHz and high cut off frequency 1.5784 GHz having Bandwidth 1.5780 GHz This circuit also shows excellent stability in the large range of frequency. The RKTG pair circuit (Reference circuit) having gain 85.3723 with low cut off frequency 2.8840 GHz and high cut off frequency 138.0384 GHz with Bandwidth 135.1544 GHz at low input voltage signal. Thus it is seen that RKTG pair amplifier together with additional circuit called gain boosting circuit provide very good result.

Keywords: RKTG Pair Amplifier, Frequency response, voltage gain, boosting stage, stability.

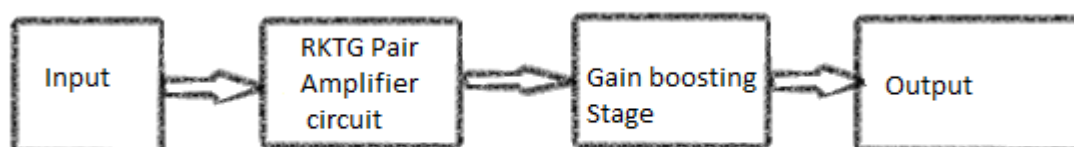
I. Introduction

Since the development of electronics majority of all the devices in use were invented and gradually technology is changing day by day to make electronics gadgets cheap and versatile with low power loss having high packing density following Moore's law. Basic problem arises when we go to high frequencies as power loss increases with frequency. Thus it is demand of time to develop flexible electronic circuit having high speed and low power loss. That can be used in low and high frequency range. The literature survey [1-5] shows that CMOS devices used for various circuit design applications have very low power loss with high noise immunity.

Literature survey also shows that delay time can be controlled by controlling the scaling factor [6,7] upto certain geometrical limit. Keeping all merits of CMOS Compound Pair Amplifier [8-15] and future technology demand. In present investigation we have to study about RKTG pair amplifier with gain boosting stage that works for low voltage and high gain application with excellent temperature stability and bandwidth.

II. Circuit Analysis

RKTG pair amplifier circuit shown in the Fig.1 have been simulated having an a.c. input signal $V_{sin}=2mV$ and the CMOS as combination of NMOS and PMOS is used as an active component to design the circuit having proper biasing with resistance $R_1=47 K\Omega$ and $R_2=5 K\Omega$. The proposed circuit consist of a gain boosting stage by proper choice of components shown in Fig.2. This circuit having four parts of processing stage as shown in block diagram. All the simulation work have been carried out by cadence software, 180nm technology.



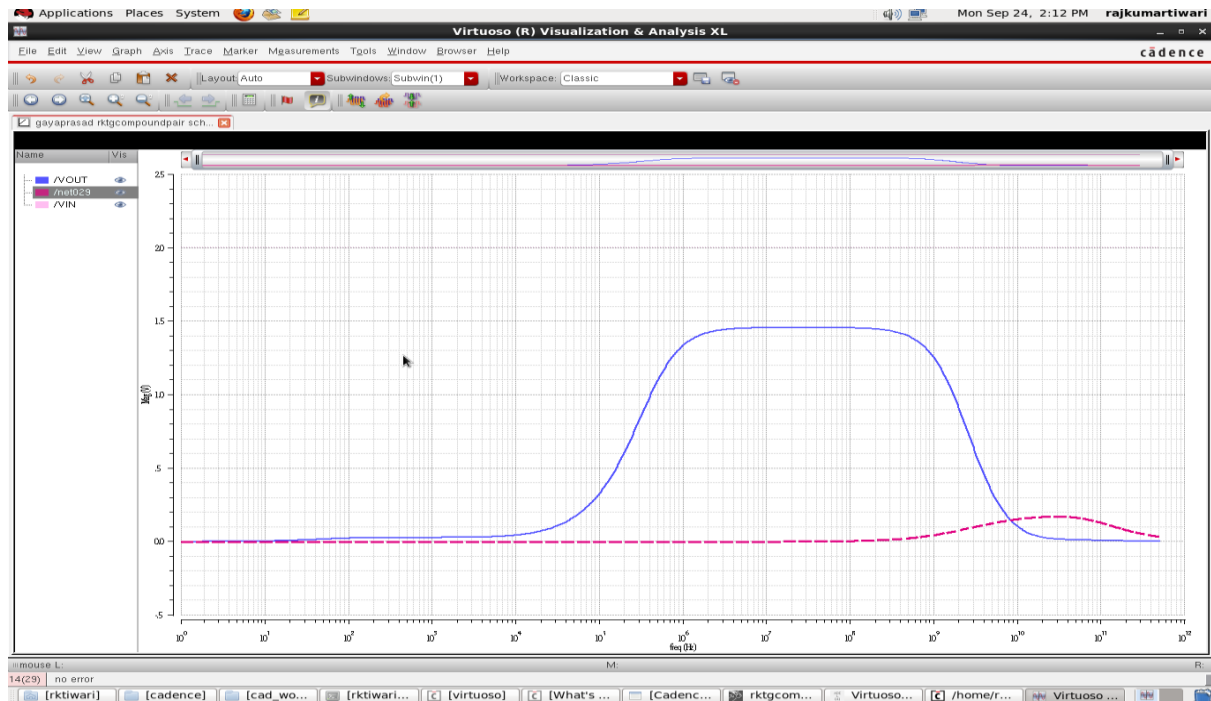


Fig.3 Comparative study of output voltage of RKTG pair circuit and RKTG pair circuit with gain boosting stage in various frequency range.

Freq.(Hz) Circuits	10 ¹	10 ²	10 ³	10 ⁴	10 ⁵	10 ⁶	10 ⁷	10 ⁸	10 ⁹	10 ¹⁰	10 ¹¹	10 ¹²
RKTG Pair Circuit with gain boosting stage	00	00	00	00	0.3	1.3	1.4	1.4	1.3	0.1	00	00
RKTG Pair Circuit	00	00	00	00	00	00	00	00	0.1	0.2	0.2	00

Table 1: Output voltage of RKTG pair circuit and RKTG pair circuit with gain boosting stage in various frequency range.

VI.Conclusion

From above discussion it is concluded that the proper choice of the circuit element play an important role to make RKTG pair /modified RKTG pair CMOS circuits with gain boosting stage is very useful for low power high speed applications in communication circuits. Due to its property of low power dissipation, such devices are capable to design reversible quantum computing electronic devices which are demand of coming future reversible logic technology.

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