
An investigation and simulation of mixer using single electron transistor (SET)

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In this thesis, mixer circuit using single electron transistor was considered. In the past, other types of transistor were utilized. Here, because of very small dimensions, low power and high performance speed, single electron transistor was used. Then, SET was investigated and Macro model of SET was simulated. Using Macro model of SET, mixer circuits were simulated via HSPICE and a mixer circuit using SET was presented. Some activities which were done in this study include: resistance effect on two simulated SETs using Macro model, the effect of SET parameters on mixer circuits, investigation of conversion loss in different frequencies with variable VDD, investigation of conversion loss in different frequencies with variable VLO with the best VDD, investigation of conversion loss with variations of IF. We hope that small dimensions of this transistor can lead to an its utilization for users in high frequency with low power.

Keywords : single electron transistor, mixer circuit, Macro model, HSPICE.

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