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Ms. Alina Sherstneva

Design and Realisation of Two-Stage Broadband Low-Noise Microwave Amplifier.

ABSTRACT - Masterthesis

The design of the low-noise amplifiers started from S-parameters and basic parameters such as amplifier stability, gain, optimum noise are considered. Two-port network is applied in order to find expressions for the power gains and input and output impedances in terms of S-parameters.

The impedance-matching networks are designed without sufficient knowledge of the characteristics of practical components, the designed network frequently turn out to be unrealizable. Because it is a major problem in the design of realizable circuits, considerable attention is given to the specified Q-factors. L-, T-, π - sections are considered.

The lumped elements are transformed to equivalent transmission lines. Additionally, significantly better results are obtained through partially transforming π - and T-sections to distributed equivalents, instead of using single inductors or capacitors.

The design of broadband multistage amplifier is also considered as well as application "Negative feedback" technique to achieve flatness over wide frequency range. The theory is confirmed by using software "AWR Design Environment" and hardware realization is made in the microwave lab of HS Bremen.