

XIII. NETWORK SYNTHESIS

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A. VOLTAGE TRANSFER FUNCTIONS – GROUNDED SYMMETRICAL NETWORKS

A synthesis procedure was developed for realizing voltage transfer functions in the form of grounded symmetrical, two-element-kind networks having any allowable gain. The method consists of first synthesizing the equivalent lattice and then converting the lattice to unbalanced form.

Solution of the problem of lattice synthesis was presented in the Quarterly Progress Reports of April 15 and October 15, 1954. The main contribution of the present study is a general method of converting two-element-kind lattices into unbalanced form, provided that the transfer function satisfies the following necessary and sufficient condition: The transfer function (voltage, impedance, or admittance) of any grounded network has positive coefficients.

Synthesis procedures have been developed which allow any voltage transfer function having positive coefficients to be synthesized first as a lattice and then converted into unbalanced form. The resulting unbalanced networks may be of the Cauer ladder, zero-shifted ladder, or parallel ladder type or a combination of these types, depending upon the form of the given transfer function.

Details of this procedure are too lengthy to be presented here; an account of the whole procedure will be published later.

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