Imitating Networks

Ahmed Mohammed Alaa, The department of Communication and computer engineering, Faculty of Engineering, Cairo University

This paper introduces a system of three modules in which all act as a smart network that have adaptive network parameters, its parameters are adjusted such that it is equal to a circuit cascaded with it, for example if this system is cascaded with an amplifier of gain 5, the overall output is an amplifier of gain 25 (two cascaded amplifiers with gain 5), the system consists of a control unit which calculates the impedance parameters of the network cascaded with it, a digital controller which controls some switches in the system, and a template circuit simulating the general equivalent circuit model of impedance parameters.

The theory of operation of the system depends on inducing a unity current to the network cascaded with it, thus calculating its input impedance and impedance parameters by preserving the values of voltages on the network's port on high speed switched capacitors, to finish this process, the system takes a period called an "installation period", this period is less than 30 milliseconds but requires the network cascaded with the system to be open circuited at its input port.

The system is called the "imitating Network" as it imitates the behavior of any network cascaded with it, the system imitates only if the user decides it should do that (an input for the user's choice is supported), an imitating network may be cascaded with an amplifier an the user allows it to imitate and become a copy of the amplifier, else it may be cascaded with an amplifier, imitate it, then removed and cascaded with a filter and still works as an amplifier as the user didn't order the system to imitate.