

26th International Conference on **Advanced Nanotechnology**
&
2nd Edition of International Conference on
Materials Technology and Manufacturing Innovations

October 04-05, 2018 Moscow, Russia

Some modern ideas of circuit diagnostics theory in the nanotechnology age

Nikolay Kinsht and **Natalia Petrunko**
Russian Academy of Sciences, Russia

Miniaturization of chips increases the problem of their diagnostics, and here it is necessary to be taken into account a number of factors. Tendencies in reducing accessibility for electrical connections and increasing the number of elements in the volume of the chip contradict each other. The problems intensify the need for additional theoretical studies on circuit diagnostics. The circuit diagnosis in common case can be defined as identification of the unknown element parameters by using test influences from current and voltage sources and by using acceptable current and voltage measurements. The analytical description of the problem solving has an important value. Complex application of several ideas permits to create a new line of circuit diagnostic models. These ideas are a conception of three different types of nodes for connecting sources and measurements, a conception of two sets of circuit elements with known and unknown parameters and idea of special matrix constructions. On the basis of this it was managed to create circuit diagnostic models taking into consideration a number of practically important features of the diagnostic process. Some of them are enumerated. Variations of external passive parameters, short circuits and breaks can be considered as test influences on the circuit. Some of the unknown parameters subsets may correlate each other with (linear) known ratios and this feature may be an important factor. It is managed to find some analytical solutions in theory of circuit diagnosis in the frequency domain.

kin@dvo.ru