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Abstract

Introducing various topological modifications is a common practice in the design of miniaturized wideband antennas. Some examples of successful alterations include ground plane stubs or slits below the feed line. In general, novel antenna topologies are reported on the case-to-case basis, often in the form of geometry evolution supported by parameter sweeps, supposedly demonstrating the benefits of the particular changes made to the device. The fundamental problem of such approaches is that neither the reference nor the modified structures are properly optimized. Due to complex interactions between geometry parameters and electrical/field properties of the antenna, the actual suitability of specific topology modifications is therefore unclear or even may lead to performance degradation. In order to illustrate this point, three antenna structures selected from the available literature are considered with geometry parameters rigorously optimized in order to find the minimum-size designs, with and without particular topology changes introduced by the authors of the respective papers. The results indicate that the optimization process virtually removes the said modifications and the optimized antenna footprints are smaller without these. The major message of the work is that conclusive assessment of the suitability of any geometry changes requires proper optimization of all relevant antenna parameters. Numerical results presented in the paper are validated experimentally.