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Soft computing-based synthesis model for equilateral triangular ring printed antenna

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Abstract: A soft computing-based synthesis model is proposed for the design of equilateral triangular ring printed antennas (ETRPAs) that operate at ultrahigh band applications. The synthesis of printed antennas having irregular shapes needs great efforts and time. Soft computing models eliminates complex, lengthy and time consuming mathematical procedures for synthesis and analysis of the printed antennas. In this paper, a soft computing model based on artificial neural network (ANN) is constructed for synthesis of ETRPAs. To generate training and testing data set, number of 100 ETRPAs with various geometrical and electrical parameters are simulated in terms of resonant frequency with the aid of a 3D full wave simulator. Soft computing model based ANN is designed to obtain the patch physical dimensions of ETRPAs simultaneously. The soft computing model is trained with simulated data set of 75 ETRPAs and tested with remainders 25 ETRPAs. A prototype of ETRPA is then fabricated to verify the proposed model. The testing results of the soft computing model are found in close agreement with simulated and experimental data. The presented model is simply/fast predicting the patch dimensions of ETRPAs and it is extremely useful to antenna engineers for the design of the ETRPAs.

Key words: Printed antenna, triangular ring printed antenna, synthesis, soft computing, artificial neural network