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Editorial

Small Antennas: Miniaturization Techniques and Applications

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Although small antenna designs and miniaturization techniques have been widely studied in recent years, there are still many challenging issues in small antenna applications and research. In this special issue, several small antennas have been proposed and discussed for wireless local area networks (WLANs), UHF band, multiple-input-multiple-output (MIMO), long-term-evolution (LTE), and other wireless communication applications. These designed antennas are not only small in size but also able to provide high performance to meet the practical engineering requirements with respect to the impedance bandwidth and the radiation patterns. On the other hand, two horn antennas with enhanced performance were developed for modern wireless communication applications. One of the horn antennas was designed to obtain high gain, which was realized by the integration of a horn antenna into a microstrip antenna. The other horn antenna was presented for ultra-wideband (UWB) applications by the combination of a TEM horn antenna with a Vivaldi antenna together. Both of the proposed improved horn antennas have been verified that they have low profile and good performance.

In addition, several compact antennas have been proposed and investigated to provide high efficiency antenna and low SAR, which are suitable for on-body and mobile communications. Motivated by the rapid developments of the microwave imaging, a right angle-bent monopole antenna has been built to obtain small size and low profile for microwave tomographic imaging application. In addition, a compact frequency selective surface (FSS) has been proposed based on the square loop aperture element. The designed FSS can give high polarization stability, angle stability, and smaller size in comparison with the previously proposed FSS structures.

Beyond that, frequency reconfigurable antennas have also been proposed in this special issue for multifunction communication applications. Since each narrowband system should be provided a different antenna, a reconfigurable antenna can be operated in several narrowband by controlling its reconfigurable states, which is flexible and can reduce the cost for practical engineering applications. A reconfigurable antenna has been investigated by using MEMS to realize multiband antenna. Furthermore, the MEMS technique has been also exploited for minimizing the antenna by means of tunable capacitors.

As for the optimization method and measurement techniques, an orthogonal design method was proposed to optimize roughly designed antennas. Additionally, a wideband differential-mode current injection testing technique was also presented based on directional coupling device.

In this special issue, two adaptive signal processing algorithms have been developed for sparse channel estimation and virtual array antenna applications. Both of the proposed adaptive algorithms can provide higher performance compared with previous classical algorithm and can be further developed for applying in the antenna arrays.

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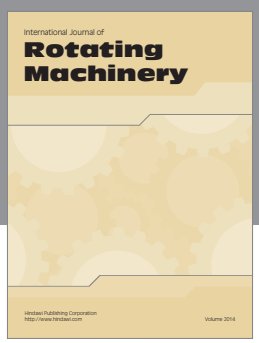

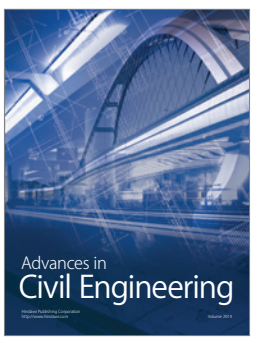

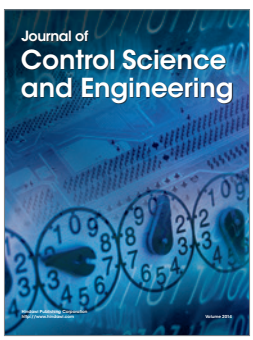

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