ANALYSIS OF SCATTERING BY SURFACES USING A WAVELET-TRANSFORMED TRIANGULAR-PATCH MODEL

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ABSTRACT: *When analyzing electromagnetic scattering by three-dimensional perfectly conducting bodies of arbitrary shape, the surface modeling is often affected by triangulation, and in turn, triangular-patch basis functions are used for expanding the unknown surface current. In this paper, we apply a wavelet transformation to transform the triangular-patch basis functions to a new set of basis functions, which can be interpreted as wavelet combinations of the original basis functions. The new basis functions can lead to a matrix representation of the operator equation that is more localized and which, by proper thresholding, can be rendered sparse. Alternatively, they can lead, via an impedance matrix compres-*

sion (IMC) approach, to a matrix equation that is compressed (rank reduced). The solution of either the sparse or the compressed matrix equation can yield fairly accurate results with less computational effort. The dependence of the results on ordering of the original triangular-patch basis functions prior to the transformation is discussed. Microwave Opt Technol Lett 21: 359–365, 1999.