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ITERATIVE SELECTION OF EXPANSION FUNCTIONS FROM AN OVERCOMPLETE DICTIONARY OF WAVELET PACKETS FOR IMPEDANCE MATRIX COMPRESSION

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Abstract–The paper further develops the recently introduced idea of compressing the impedance matrix by an iterative selection of expansion functions. The improved algorithm uses an overcomplete dictionary comprising bases whose inherent properties match some features of the given scattering problem. Thus, the overcomplete dictionary offers a variety of expansion functions from which a solution-oriented spanning set for the unknown current is extracted. The number of iterations in the proposed algorithm is suppressed by selecting more than one expansion function at each iteration. This latter section is facilitated by a matching pursuit process. It is shown that the compression ratio of the resultant compressed impedance matrix is superior to the one achieved by the ordinary iterative matrix compression algorithm.