

This project is devoted to the development of algorithms for simulation, design and integration of high-GHz wireless systems-on-chip modules. Due to the high center frequencies involved, the classical multistep methods for solving ordinary differential-algebraic equations (DAEs) are not feasible anymore due to extraordinary run times. The algorithmic aims are twofold: search for an appropriate wavelet bases to sparsely represent signals on the one hand and reformulating the ordinary DAEs as partial differential equations (PDEs) on the other. The PDEs and DAEs are related by their characteristics. Determining sparse representations of the signal waveforms is supported by the mathematical analysis of entropy-minimizing best-bases algorithms and by the analysis of the induced rearrangement operators on Triebel-Lizorkin spaces.