Selected New Features in the Commercial Field Solver FEKO

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FEKO is a general electromagnetic simulation package offering comprehensive solutions for electromagnetic radiation and scattering problems using different numerical simulation methods and supporting modern computer hardware infrastructure (GPU computing, clusters, multicore etc.). The applications of FEKO include areas such as antenna design, antenna placement, radar analysis, bio-electromagnetics, communications, microwave components (waveguides, filters, microstrip circuits …) and also the wide area of electromagnetic compatibility (shielding, coupling etc.).

Some of the latest extension to the computational kernel of FEKO shall be presented:

- A combination of the MoM/SEP (Method of Moments/Surface Equivalence Principle) with the planar multilayer Green's function allowing to model finite size 3D objects buried in multilayer substrates/earth, but also at the same time allowing to truncate such multilayer substrates to finite sizes without actually meshing them.

- Extension to the GPU (graphical processing unit) computing to support multiple GPUs and the latest graphics hardware (e.g. NVIDIA Kepler K20) with excellent compute performance.

- FEKO has traditionally for the MoM part used linear rooftop RWG (Rao-Wilton-Glisson) type basis functions on triangular patches. This has been extended to higher order (up to order 3.5) to produce a significant reduction in the overall number of unknowns required to model a given structure, while maintaining (or even increasing) the solution accuracy.

- Special solvers (DGFM = Domain Green's Function) were added to the FEKO kernel for modelling large finite (also possibly irregular) arrays of identical elements.

- An eigenvalue solver was added to the MoM allowing users to extract Characteristic Mode information, which is very useful in understanding the fundamental current and charge distributions on platforms and how antennas would excite this (and what type of radiation performance to expect then out of these).