The geometry of interest: Generalized form of the equations for FEM solver and generic boundary condition:

\[ a \cdot \nabla Y = (a - \epsilon) \cdot \nabla (Y + (c + \epsilon) \cdot Y + (d' - \epsilon) \cdot \frac{\partial Y}{\partial z} + d \cdot \frac{\partial Y}{\partial z} + fc) \]

\[ \frac{\partial Y}{\partial z} |_{z=0} + \epsilon \cdot Y = w \]

The current along the axis of arbitrarily shaped wire is governed by Pocklington’s integro-differential equation in frequency domain. The equation is given for a set of Nw arbitrarily shaped wires.

The computational example exhibits four arm folded spherical helical antenna (SHA) that is used in wireless power transfer (WPT) applications.

The equation is solved by means of GB-IBEM method and results are compared with the ones obtained by FEKO. The used method is computationally less expensive.

The stochastic models are based on Stochastic Collocation (SC) method. Other stochastic approaches are being explored such as Stochastic Reduced Order Method (SROM), Stochastic Finite Element Method.

Research activities comprised deterministic and in particular stochastic modelling in Computational Electromagnetics (CEM) mainly in the following applications:

- Bioelectromagnetism, human exposure to electromagnetic fields, biomedical applications of electromagnetic fields.
- Electromagnetic compatibility of thin wire structures (GPR antennas, arbitrarily shaped wires).
- Magnetohydrodynamics and plasma physics: transport equations for magnetically confined plasma.

The deterministic approach in my research is based on Galerkin-Bubnov scheme of Finite Element and Boundary Element Methods.

The stochastic models are based on Stochastic Collocation (SC) method.