

Numerical modeling of magnetic field dynamics in tokamak taking into account the induced eddy currents

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Modeling of magnetic configurations in the vacuum chamber of the tokamak, including a null-field, taking into account eddy currents is actual for planning the initial phase of plasma production at tokamak – initiation of the plasma discharge. Since analytical calculations of magnetic field are impossible for dynamic currents in multi-element structure of tokamak, special computer code have to be used. The numerical code for modeling of magnetic field dynamics in tokamak calculates magnetic field inside the vacuum chamber of tokamak using known functions of current $I_j(t)$ for every active magnetic field source j . Eddy currents in passive elements are

calculated by solving circuit equations for every time step.

The code implemented in C++ using QT and QWT libraries for GUI. GUI of the code based on the code TokScen [1]. Numerical algorithms of matrix inversion and bicubic spline interpolation from ALGLIB library are used.

The code verification is being done on experimental data from series of diagnostics of KTM tokamak.

References

- [1] A.D. Sadykov et al 2015 *Nucl. Fusion*, **55** 043017. doi:10.1088/0029-5515/55/4/043017. <http://stacks.iop.org/0029-5515/55/043017>