

Abstract Submitted
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A method for coupling lumped element circuits to plasma simulations¹ FREDERIK SCHMIDT, TOBIAS GERGS, Institute of Theoretical Electrical Engineering, Ruhr University Bochum, THOMAS MUSSENBROCK, JAN TRIESCHMANN, Electrodynamics and Physical Electronics Group, Brandenburg University of Technology — External lumped element circuits such as matching networks, filter elements and generators are necessary for most plasma applications to function properly. In various experimental studies it has been shown that these elements interact with the plasma in a nonlinear way. Many plasma simulations do not include external circuits though for various reasons. One of them being, that including the external circuits in the form of Kirchhoff's differential equations can become cumbersome, especially for large circuits. In this work a simulation approach is proposed based on Harmonic Balance Analysis that allows for principally arbitrary plasma simulations to be coupled to external circuits, while avoiding to solve Kirchhoff's equation by hand. The method is studied at the example of an equivalent circuit plasma model and compared to a transient simulation of the system.

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