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P1.1083 Integrated code framework for operation scenario development with the global-optimizer-based iterative solver GOTRESS

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See the full abstract here:
http://ocs.ciemat.es/EPS2019ABS/pdf/P1.1083.pdf

The steady-state transport equation solver, GOTRESS, has been developed, which directly finds the solution where a transport flux matches an integrated source using global optimization techniques such as a genetic algorithm and Nelder-Mead method [M. Honda, Comput. Phys. Commun. 231 (2018) 94.], given an equilibrium and source profiles in advance. Very recently a novel integrated model with GOTRESS as a kernel of the model, GOTRESS+, has been developed, mainly consisting of the equilibrium and current profile solver ACCOME and the neutral beam (NB) heating code OFMC. A workflow of GOTRESS+ is in the following, as summarized in fig. 1. The prescribed density and temperature profiles are given to ACCOME as a first step. After the iterative calculations in ACCOME, a consistent solution is obtained between an equilibrium and a current profile according to the given kinetic profiles. Then OFMC estimates the NB heating and current drive profiles. GOTRESS in turn predicts the temperature profiles based on the data computed by ACCOME and OFMC. The first iteration of GOTRESS+ is now completed and the second iteration commences at the same time as the predicted temperature profiles are sent to ACCOME. This iteration continues until the profiles are well converged. GOTRESS+ results have been successfully compared to those by the integrated code TOPICS.

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Presenter: HONDA, M. (EPS 2019)

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