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## **FPGA acceleration of Model Predictive Control for ITER Plasma current and shape control**

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A faster implementation of the Quadratic Programming (QP) solver used in the Model Predictive Control scheme for ITER Plasma current and shape control was developed for Xilinx Field-Programmable Gate Array (FPGA) platforms using a high-level synthesis approach. The QP solver is based on the dual Fast Gradient Method (dFGM). The dFGM is essentially an iterative algorithm, where matrix-vector arithmetic operations within the main iteration loop may be parallelized. This type of parallelism is not well-suited to standard multi-core processors because the number of operations to be spread among processing threads is relatively small considering the time-scale of thread scheduling. The FPGA implementation avoids this issue, but it requires specific techniques of code optimization in order to achieve faster solver execution.

### **Minioral**

Yes

### **Description**

FPGA control

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