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Plasma shape and position controller design for advance plasma configurations in TCV HIMANK ANAND, STEFANO CODA, Ecole Polytechnique Federale de Lausanne (EPFL), Centre de Recherches en Physique des Plasmas (CRPP), CH-1015 Lausanne, Switzerland, FEDERICO FELICI, Eindhoven Institute of Technology, P.O. Box 51, 5600 MB Eindhoven, The Netherlands, JEAN MARC MORET, HOANG BAO LE, Ecole Polytechnique Federale de Lausanne (EPFL), Centre de Recherches en Physique des Plasmas (CRPP), CH-1015 Lausanne, Switzerland — The performance and stability of tokamak plasma configurations depend strongly on its shape and position. They play a particularly important role in the stability of global magneto-hydrodynamics (MHD) modes and in heat and particle transport. We report on the controller design of a new generalised plasma shape and position controller for advance plasma configurations, using the linearised plasma model RZIP. The controller design is based on an isoflux control scheme and utilises singular value decomposition (SVD), which provides a natural framework for limiting the controlled parameters to the set with the largest singular values, while respecting the combined poloidal field coil current (PF) limits. It also includes the option of weighting the various observers based on the level of importance for a given plasma configuration. The generalised plasma shape and position control algorithm has been successfully tested off-line for limiter and diverted plasma (single null and snowflake configuration) shapes. The testing and commissioning of the controller will commence in the next TCV experimental campaign.

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