Abstract Submitted
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Model predictive control of plasma profilesat DIII-D WILLIAM
CONLIN, JOSEPH ABBATE, Princeton University, EGEMEN KOLEMEN,
KEITH ERICKSON, Princeton Plasma Physics Lab — neural network has been
developed to predict future values of plasma profiles in real time using past data
and a set of proposed actuator inputs. Thispredictive model offers many opportu-
nities for real time control. The simplest method, which is already possible with
the current model, is to simply make multiple predictions using different proposed
actuator inputs, and selecting the inputs that lead to the "best" predicted profile.
This can be improved upon by modifying the model to make over a longer horizon,
sinstead of just predicting the next timestep, it can predict the next timesteps. This
then allows for longer lookaheads in the control action, which allows us to predict
and preemptively mitigate instabilities before they become dangerous, to potential-
lyfind new routes to H-mode, which currently requires very strong heating, and can
be difficult to achieve.

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