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3D Coil Design Using Splines for Simplified Maintenance in Fusion Devices.[1] NICOLA LONIGRO, University of Padua, CAOXIANG ZHU, Princeton Plasma Physics Laboratory — Difficulty in fabricating non-planar coils is one of the main challenges for stellarators. Many efforts have been undertaken in recent years to simplify their coil designs. The FOCUS code (Caoxiang Zhu et. al. 2018 Nucl. Fusion 58 016008) gets rid of the toroidal winding surface used in previous approaches and uses an arbitrary closed curve in 3D to represent the coils, such that more possible solutions can be found. Until now, the coils were described by the Fourier series. In this work, the FOCUS code has been expanded to use a spline representation for the coils. By using a spline representation it is possible to implement real space constraints more easily by acting on the control points describing the spline. More importantly, this new development will allow FOCUS to design straight out-leg coils with improved accessibility and simplified maintenance, which would be vital for future fusion reactors.

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