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Optimized Shape of TF Coil

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The effect of gravity is Insignificant on the Conductor tension of TF coil. For The Chinese Fusion Engineering Test Reactor (CFETR), the influence is about one ten thousandth. Therefore, the design of TF coil shape generally does not consider its gravity.
The shape of the TF coil is determined by the constant-tension and without bending moment equation regardless of its gravity. By calculating the equation, the Princeton-D curve can be worked out in the case of giving the radial position of the TF centerline. Because the radius of curvature of Princeton-D curve varies continuously in space, it is difficult to manufacture. Therefore, the Princeton-D curve is generally fitted with three symmetrical arcs up and down.
There are four variables in the fitting process, and the fitting result may be not optimal because of different fitting methods. In this paper, a criterion is given to determine whether the fitting result is optimal or not. Based on the criterion, it is possible to determine whether the shape of TF coil is optimal or not for each fusion device.

Eligible for student paper award?

No

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