Abstract Submitted
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Exploring the limits of analytical solutions to the Grad-Shafranov equation with the Solov'ev profile J. JULIO E. HERRERA-VELAZQUEZ, KASSANDRA SALGUERO-MARTINEZ, Instituto de Ciencias Nucleares, UNAM, MIGUEL ANGEL SEGURA-RAMIREZ, None — Solutions to the Grad-Shafranov equation for the Solov'ev profiles, which are the simplest ones, can reproduce several features of the experiments, such as the average βpoloidal, the average safety factor q^*, the Shafranov shift, etc., when the free parameters are appropriately chosen. This provides a flexible instrument to understand the role of the aspect ratio, elongation and triangularity on the physics of tokamaks. This work starts from the solutions proposed by Cerfon and Freidberg for the equatorially symmetric case [1], and stretches them to their limits. The starting point is the set of parameters for the spherical tokamak START, and then the consequences of varying the inverse aspect ratio ε. Similar solutions have also been proposed by Zheng et al. [2], with a different particular solutions for the homogeneous Grad-Shafranov equation $\triangle^* \psi_p (R, Z) = 0$. We show there is a more general family of particular solutions, but the satisfaction of the boundary conditions leads to an adjustment of the coefficients in the general solution that produce the same results. [1] A.J. Cerfon y J.P. Freidberg, Physics of Plasmas 17 (2010) 032502 [2] S.B. Zheng, A.J. Wootton and E. Solano, Physics of Plasmas 3 (1996) 1176

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