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Numerical Calculation of MHD Equilibria with Poloidal-Sonic Flow and FLR Effects¹ DANIEL RABURN, ATSUSHI FUKUYAMA, Department of Nuclear Engineering, Kyoto University, Kyoto, Japan — We have developed a code for calculating MHD equilibria with poloidal-sonic flow and FLR effects in high-beta tokamaks, using an aspect-ratio expansion and the two-fluid model. We show that the equilibrium condition can be expressed in terms of differential equations for the first- and second-order poloidal flux and five free profiles of the first-order poloidal flux. We present results for sample equilibria, illustrating behaviors such as the deviation of pressure contours from the flux surfaces and the criteria for the presence of the “poloidal-sonic singularity.”

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