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Unified Treatment of Model and General Plasma Shape for Neoclassical and Gyrokinetic Calculations[1] J. CANDY, General Atomics — This work describes a unified method to treat model and general flux-surface shape in gyrokinetic and neoclassical transport calculations. In all cases the equilibria are guaranteed to be exact solutions of the Grad-Shafranov equation on each flux surface. In the case where model equilibria are considered, we provide a modest extension (adding finite elevation and squareness) of the original method usually attributed to Miller, whereas for general equilibria, a Fourier method is developed. The unified formulation makes use of and extends the intuitively appealing concepts of a midplane minor radius and effective field, originally introduced by Waltz. In the limit that the model and general flux-surface shapes approach one another, the two methods give identical results. This work may serve to standardize the overall approach to shaped plasma geometry, reducing the probability of haphazard implementations and thereby simplifying the task of code verification.

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