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Ideal MHD Continua, Mercier Stability, Sturmian Sequences, and Interchange Modes in Tokamak,* A.D. Turnbull, *General Atomics*; D.P. Brennan, *Tulsa U.*; J.M. Finn, *LANL* – Numerical investigations are used to systematically study the dependence of unstable mode eigenvalues and mode structures as they are stabilized and pass into the continuum as physical parameters are varied. It is well known that the ideal MHD spectrum consists of a pair of stable continua corresponding to the shear Alfvén and acoustic waves, and a discrete unstable component [1]. Additional discrete modes can also exist within frequency gaps in the continua. In a special case, typically when the equilibrium is interchange unstable according to the Mercier criterion, a Sturmian sequence of unstable modes is predicted in 1D with an accumulation point at the edge of the shear Alfvén continuum [1]. In this case, the existence of Sturmian sequences is verified in 2D and their relation to the Mercier trial modes and to the continuum is analyzed. The sequence continuously transforms from a global kink into localized interchanges and ultimately singular continuum-like modes with increasing eigenmode number.

[1] J.P. Goedbloed and S. Poedts, *Principles of Magnetohydrodynamics* (Cambridge, 2004).

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