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Configurational Entropy of Perturbed Classical Systems DAMIAN SOWINSKI, MARCELO GLEISER, Dartmouth College — The canonical way of building theories in physics relies heavily on Hamilton's principle of least action. The resulting classical solution to a given theory is one whose energy is minimized; any perturbation to the solution results in an increase in its energy. The question is whether there are other quantities that are extremized by the variational principle, including gravitationally bound systems. Recently, Gleiser and Stamatopoulos have investigated a novel physical quantity defined in Fourier space, Configurational Entropy (CE), in several non-gravitational settings. Classical solutions for non-periodic potentials seem to imply that this quantity is indeed minimized under a wide range of trial functions that attempt to emulate them. Here we investigate the spectrum of perturbations to classical solutions of Newtonian and generally-relativistic gravitationally-bound systems and their effect on the CE. In particular, for stellar polytropes we show how the minimum of the CE is minimized for polytropic index related to tightly-bound compact objects and how it can be used to indicate the onset of gravitational instability.

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