Title: Shear-free barotropic perfect fluid constraints in General Relativity

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Abstract

We present a concise treatment of the shear-free perfect-fluid constraints in General Relativity, with implications for the shear-free perfect-fluid conjecture. By redefining the relevant kinematic and dynamical variables, we show how to control the constraint propagation process economically. Along the way, we show how to apply these variables to simplify some of the special-case proofs of the conjecture. To achieve this, we use the so-called *basic* variables, which have been shown to simplify the constraint propagation process. All this is done on the two-sheet orthogonal to the vorticity vector.