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The stress-energy tensor in conformal loop ensembles

The scaling limit of two-dimensional statistical models at criticality is believed to be described by two distinct mathematical frameworks: the algebraic framework of vertex operator algebras—this is what is usually called conformal field theory (CFT), and the probabilistic framework of Schramm–Loewner evolution (SLE) and its generalisations, in particular conformal loop ensembles (CLE). The first one leads to many non-trivial predictions about local observables, but its axioms are based on physically-motivated principles of quantum field theory. The second one deals with random curves and loops and its connection to statistical models can often be proven, but as of yet says little about local observables and the powerful algebraic structure which describes them. The main local observable, at the basis of the algebraic structure, is the stress-energy tensor. After reviewing the basics of CLE for $8/3 < \kappa < 4$, I will propose a definition for the stress-energy tensor which reproduces results from CFT: the conformal Ward identities with non-zero central charge, its transformation property with Schwarzian derivative (leading to the Virasoro algebra), and its relation to small variations of the boundary of the domain where the loops lie. This construction generalizes that of the case of zero central charge (with V. Riva and J. Cardy, 2006), SLE at $\kappa = 8/3$.