

Conformal Conserved Currents in Embedding Space: A General Framework

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Abstract

In this talk, I will consider conformal conserved currents in arbitrary irreducible Lorentz representations in the context of the embedding space OPE formalism due to Fortin and Skiba (DOI:10.1007/JHEP06(2020)028). I will begin by giving some background on the formalism. I will then briefly discuss how conservation conditions on higher-point functions can be fully enforced within this framework by restricting attention to two- and three-point correlation functions. Next, I will describe how to construct an explicitly conformally-covariant conserved current differential operator in this context. As I will argue, the appropriate operator is none other than the OPE differential operator in embedding space, revealing an interesting correspondence between the OPE differential operators and the conserved current differential operators in embedding space and the equivalent objects in position space. I will subsequently explore several explicit examples of conserved currents in various irreducible representations, primarily focusing on conservation conditions for $\langle JJ\mathcal{O} \rangle$. Further, I will summarize the principal results of the analysis relevant for the conformal bootstrap of $\langle TTTT \rangle$ and $\langle JJJJ \rangle$. Lastly, I will examine how to reproduce and extend the consequences of conformal Ward identities at coincident points within this framework.