Closed-form expression for cross-channel conformal blocks near the lightcone

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Abstract: In the study of conformal field theories, conformal blocks in the lightcone limit are fundamental to the analytic conformal bootstrap method, as they are closely related to the leading twist spectrum. Here we consider the lightcone limit of 4-point functions of generic scalar primaries. Based on the nonperturbative pole structure in spin of Lorentzian inversion, we propose the natural basis functions for cross-channel conformal blocks. In this new basis, we find a closed-form expression for crossed conformal blocks in terms of the Kampe de Feriet function, which applies to intermediate operators of arbitrary spin in general dimensions. We derive the general Lorentzian inversion for the case of identical external scaling dimensions. Our results for the lightcone limit also shed light on the complete analytic structure of conformal blocks in the lightcone expansion.

References

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