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Matrix moment approach to positivity bounds and UV reconstruction from IR

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Positivity bounds in effective field theories (EFTs) can be extracted through the moment problem approach, utilizing well-established results from the mathematical literature. We generalize this formalism using the matrix moment approach to derive positivity bounds for theories with multiple field components. The sufficient conditions for
obtaining optimal bounds are identified and applied to several example field theories, yielding results that match precisely the numerical bounds computed using other methods. The upper unitarity bounds can also be easily harnessed in the matrix case. Furthermore, the moment problem formulation also provides a means to reverse engineer the UV spectrum from the EFT coefficients, often uniquely, as explicitly demonstrated in examples such as string amplitudes and the stu kink theory.

Secondary track

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