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The S-matrix Bootstrap with Neural Networks

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I will introduce a new method for solving the unitarity equations in the S-matrix bootstrap framework using neural networks. This approach is designed to be applied to amplitudes that satisfy the Mandelstam representation, which helps ensure an accurate description of the fine structure of the scattering amplitude, particularly their double discontinuity. As an initial validation, we applied both our method and the standard bootstrap technique to a simplified toy model focusing on the S-wave unitarity condition. The resulting allowed regions show strong agreement, which highlights the potential of our method. Based on these promising results, we plan to extend our approach to solve the Mandelstam equation.

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