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TBA and functional relations for the AdS_5/CFT_4 correspondence

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The exact anomalous dimensions of the single trace composite operators in the planar limit of $N = 4$ super Yang-Mills can be studied in the framework of the Thermodynamic Bethe Ansatz method (TBA). In this talk, I will discuss the analytic properties of the TBA solutions -the Y-functions- and the associated set of functional relations -the Y-system-.

Contrary to the more studied relativistic invariant cases, the AdS_5/CFT_4 -related Y-functions live on multi-sheeted coverings of the complex plane with an infinite number of square-root branch points.

As a direct consequence of this fact, the TBA equations and in particular the dressing kernel cannot be obtained from the Y-system without extra information on the square-root discontinuities across semi-infinite segments in the complex plane.

It is shown that the discontinuity functions fulfill an independent simple set of local functional equations.

The Y-system extended by the discontinuity relations forms a fundamental set of local non-linear constraints that can be easily transformed into integral form through Cauchy's theorem.

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