

Advanced Non-Perturbative Techniques in N=4 SYM Theory

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I will report on recent advances in Bootstrability – a method merging Integrability and Conformal Bootstrap to extract CFT data in integrable conformal gauge theories such as N=4 SYM. We will discuss the method in applications to the 1D defect CFT. Integrability not only produces a spectrum in this theory but also provides information in the form of integrated correlators. Combining this information we obtain very sharp rigorous numerical bounds for the structure constant of the first non-protected states, giving this observable with seven digits precision for the 't Hooft coupling in the intermediate coupling region $\lambda/\sqrt{4\pi} \sim 1$, with the error decreasing quickly at large 't Hooft coupling.

We also studied the problem of bounding directly a 4-point function at generic cross ratio. Our numerical bounds give an accurate determination of the 4-point function for physical values of the cross ratio.

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