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Deep Finite Temperature Bootstrap

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We introduce a neural network-based method to bootstrap crossing equations in Conformal Field Theory at finite temperature. Traditional approaches relying on positivity constraints or truncation schemes that discard infinite towers of operators are not applicable to this problem. Instead, we use MLPs to model spin-dependent tail functions that capture the combined contribution of infinitely many operators. The method formulates the Kubo-Martin-Schwinger (KMS) condition as a non-convex optimisation problem, combining thermal dispersion relations with neural network representations of the unknown data. We demonstrate the approach on Generalized Free Fields and apply it to extract double-twist thermal data in holographic CFTs.

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