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Black hole perturbations from Liouville correlators

Reversing the logic of the bootstrap approach in Liouville CFT we explicitly compute the connection formulae for degenerate conformal blocks. In the semiclassical limit of the theory, this amounts to solving the connection problem of Fuchsian ODEs. Generalizing to irregular insertions we solve as well for various confluences. Concentrating on the Heun equation and its confluences, we can solve the wave equations of a large class of gravitational backgrounds. Indeed, when the wave equation of a black hole or a microstate is separable, it often reduces to Heun equations, and exact connection formulae give access to several interesting quantities. In recent work we focused on the 4d Kerr black hole, and exactly computed the absorption coefficient, QNMs and Love numbers in terms of combinatorial objects exploiting the AGT duality. In works in progress we are generalizing to perturbations of asymptotically AdS spacetimes.

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