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Subregion action complexity in AdS₃ and in the BTZ black hole

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We analytically compute subsystem action complexity for a segment in the BTZ black hole background up to the finite term, and we find that it is equal to the sum of a linearly divergent term proportional to the size of the subregion and of a term proportional to the entanglement entropy. This elegant structure does not survive to more complicated geometries: in the case of a two segments subregion in AdS₃, complexity has additional finite contributions. We give analytic results for the mutual action complexity of a two segments subregion.

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