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The Disk Partition Function in String Theory

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We investigate the disk partition function for the open string. This is a subtle problem because of the presence of a residual gauge group $PSL(2,\mathbb{R})$ on the worldsheet even after fixing the conformal gauge. It naively has infinite volume and leads to a vanishing answer. We use different methods that all demonstrate that $PSL(2,\mathbb{R})$ effectively behaves like a group with finite negative volume in the path integral, which leads to a simple prescription for the computation of the disk partition function. We apply our findings to give a simple rederivation of the D-brane tensions.

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