Exercises for Conformal Field Theory (MD4)

Problem set 11, due January 22, 2020

If you have questions write an E-mail to: mtraube@mpp.mpg.de

1 Mixed overlaps

A) Compute the cylinder partition function of the free boson for mixed boundary conditions (N,D)

$$\mathcal{Z}_{\text{bos.}}^{\mathcal{C}(\text{mixed})}(t) = \text{Tr}_{\mathcal{H}_{(N,D)}}\left(q^{L_0 - \frac{c}{24}}\right) \qquad \text{where} \qquad q = e^{-2\pi t}. \tag{1}$$

B) Compute the probability for a closed string to be absorbed and emitted between mixed boundary states

$$\tilde{\mathcal{Z}}_{\text{bos.}}^{\mathcal{C}(\text{mixed})}(l) = \langle B_{\text{N}} | e^{-2\pi l (L_0 + \overline{L}_0 - \frac{c + \overline{c}}{24})} | B_{\text{D}} \rangle. \tag{2}$$

The tilde indicates that we are in the closed sector.

C) Recall the open-closed duality from the lecture to explain how the two results are connected and how to dualize them into each other.