Twist Symmetry and Classical Solutions in String Field Theory

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In this talk[1], we have investigated a class of classical solutions of cubic string field theory. The solutions are specified by

$$g(w) = 1 + \frac{a}{2}\left(w + \frac{1}{w}\right)^2 - ib\left(w - \frac{1}{w} + w^3 - \frac{1}{w^3}\right).$$

Nonvanishing odd part (i.e., nonzero b) yields a classical solution which contains a twist odd part. Thus our solutions are not twist invariant manifestly. Does the solutions break twist invariance actually? We found that the answer is *NO*.

The cohomology and level truncation analysis imply existence of nontrivial solution at the boundary of the moduli space. Thus our solutions are candidates for the 'closed string vacuum' where there are no open strings. Furthermore, we have constructed a conformal map which connects our solution to the twist even solution[2] given by $g(w) = 1 - 1/4(w + 1/w)^2$. Thus this result completely shows that twist symmetry of CSFT will never be broken by our solutions.

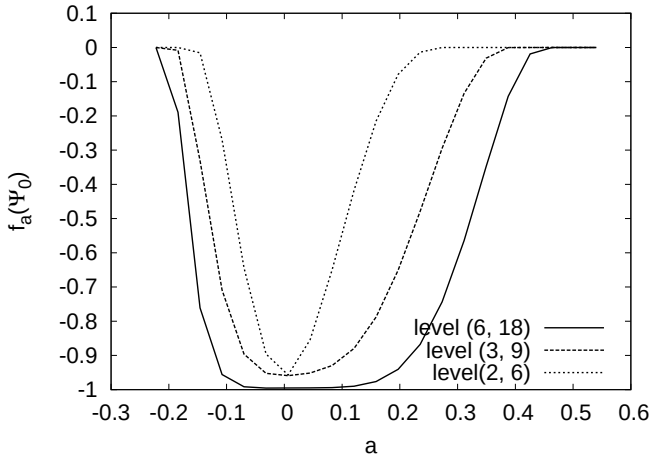

Figure 1: A plot of the value of CSFT potential around $a = b$ solution.

[1]Based on hep-th/0508196
[2]T. Takahashi and S. Tanimoto, JHEP **03**, 2002, 033 [hep-th/020133]