

README

This mathematica package searches for a unitary 4-point function with large scalar gaps.

Once the package is loaded using the command *new* will show some functions that could be used, also since there are some functions named with subscript letters as in e_m it will show some errors but all the functions works fine.

For those who want to look at the logic behind the code it will be best to look at the *in depth* PDF. The main functions needed to obtain the result is the *Bootstrap* function.

Bootstrap function

The *Bootstrap* $[\Delta_\phi, size, sgap]$ searches for a 4-point function spawn by the basis $\mathcal{B} = \{(a, b, c), a, b, c \in \mathbb{Z}_{\geq 0}, a + b + c = 2\Delta_\phi\}$ with gap at least $2sgap$ and positive OPE coefficient for the operators with $\frac{\tau}{2} \equiv n \leq size$ and $l \leq size$. It will check the OPE coefficients to prove whether they are all positive or not, if the number of negative coefficients is zero we can guarantee that the 4-point function is unitary.

```
In[1]:= << Integers`  
Message::name : Message name e_m::usage is not of the form symbol::name or symbol::name::language. >>  
  
In[2]:= Bootstrap[4, 20, 5]  
Solution1 was found  
Solution2 was found  
The number of negative OPE coefficients is 0
```

Figure 1: Example of an output of the *Bootstrap* function giving a unitary 4-point function