

Series 5

I. 3-point fun of scalar quasi-primaries using null cone formalism

1. Rederive the form of the 3-pt function, this time using the null-cone formalism, following the arguments for the 2-pt function in the notes.

II. Higher spin fields in the null-cone formalism

1. Show that tracelessness is preserved by the projection on the section (2.45). To do so, show that

$$\delta^{\mu\nu} \frac{\partial X^M}{\partial x^\mu} \frac{\partial X^N}{\partial x^\nu} = \eta^{MN} + X^M K^N + X^N K^M, \quad (1)$$

with $K_M = (0, 2, 0)$. Complete the argument using this result.

2. Show that (2.47) and (2.48) lead to (2.49) in the notes for the case of spin 1 (vector field). To do so, show that

$$\phi'(x') \cdot dx' = \Lambda^{-(\Delta-1)/2} \phi(x) \cdot dx. \quad (2)$$

Use furthermore the projection rule and that under Lorentz transformations, the scalar product $\phi(X) \cdot dX$ is preserved.