

PREPARED FOR SUBMISSION TO JHEP

Modern amplitude techniques

Taro V. Brown^a

^a*Department of Physics, UC Davis, One Shields Avenue, Davis, CA 95616, USA*

E-mail: taro.brown@nbi.ku.dk

ABSTRACT: Notes on modern amplitude techniques written as part of a research project with Jaroslav Trnka.

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1 Problem 1

We will take the rotated null coordinates given by,

$$\begin{aligned}u &= t - x & v &= t + x \\U &= \text{atan } u & V &= \text{atan } v \\T &= V + U, & X &= V - U\end{aligned}\tag{1.1}$$

Which combined give

$$T = \text{atan}[t + x] + \text{atan}[t - x], \quad X = \text{atan}[t + x] - \text{atan}[t - x]\tag{1.2}$$

2 Problem 2

We will take the rotated null coordinates given by,

$$\begin{aligned}u &= t - x & v &= t + x \\U &= \text{atan } u & V &= \text{atan } v \\T &= V + U, & X &= V - U\end{aligned}\tag{2.1}$$

Which combined give

$$T = \text{atan}[t + x] + \text{atan}[t - x], \quad X = \text{atan}[t + x] - \text{atan}[t - x]\tag{2.2}$$