For $u+x>0$ one has $z>0$ and for $u+x<0$ one has $z<0$. One can also find analogous Poincaré coordinates for each of the regions where $u-x$ has a definite sign.

3.2. Identifications

3.2.1. Identification subgroup associated with Killing Vector

Any Killing Vector ξ defines a one parameter subgroup of isometries of anti-de Sitter space

$$P \longrightarrow e^{t\xi} P \qquad ; \quad t = 0, \pm 2\pi, \pm 4\pi \ldots$$

$$\xi \cdot \xi > 0 \qquad (3.15)$$