Contents

0.1 The Lorentz group

The Lorentz group is the $O(1,3)$ group.

0.1.1 Symmetries of the Lorentz group

We can do the usual 3 rotations, however there are additional 3 symmetries, making the Lorzentz group 6-dimensional.

These are the Lorentz boosts.

A symmetry has:

$t'^2 - x'2 - y'^2 - z'^2 = t^2 - x^2 - y^2 - z^2$

We consider the case wherewe just boost on x, so $y = y'$ and $z = z'$.

$t'^2 - x'2 = t^2 - x^2$

Or with c:

$c^2t'^2 - x'2 = t^2 - x^2$