Singular Lorentz Transformations and Pure Radiation Fields

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April 21, 2014

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2014-04-21

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1. Introduction
2. Line Element in Minkowskian Space-Time
3. Test
4. Singular Lorentz transformation

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Introduction: Lorentz Transformations

- A Lorentz transformation is defined by the preservation of the quadratic form

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

  in the transformation $(x, y, z, t) \rightarrow (x', y', z', t')$
- Take the Proper Orthochronous Lorentz transformations which form the restricted Lorentz group $SO^+(1,3)$
- In general lorentz transformations have two invarient null directions

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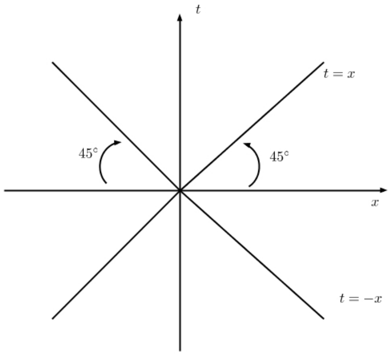

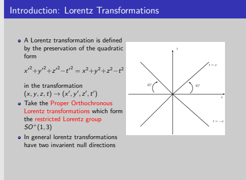

–Proper is det 1 . preserves the orientation of spacial axes, preserves handedness–orthochronous means time is always positive and the direction of time is preserved–Think of the standard Lornetz transformation, always two null directions at $x \pm t$