Discrete space-time and Lorentz transformations

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Abstract. Alfred Schild has established conditions that Lorentz transformations map world-vectors (ct, x, y, z) with integer coordinates onto vectors of the same kind. The problem was dealt with in the context of tensor and spinor calculus. Due to Schild's number-theoretic arguments, the subject is also interesting when isolated from its physical background.

The paper of Schild is not easy to understand. Therefore we first present a streamlined version of his proof which is based on the use of null vectors. Then we present a purely algebraic proof that is somewhat shorter. Both proofs rely on the properties of Gaussian integers.