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Eric Bedford and **Kyounghee Kim*** (kim@math.fsu.edu), Department of Mathematics, FSU, Tallahassee, FL 32306. *Linear Fractional Recurrences as Birational maps of 3-space: Periodicities and pseudo-automorphisms of positive entropy.*

The family of 3-step linear fractional recurrences

$$z_{n+3} = \frac{\alpha_0 + \alpha_1 z_n \alpha_2 z_{n+1} + \alpha_3 z_{n+2}}{\beta_0 + \beta_1 z_n + \beta_2 z_{n+1} + \beta_3 z_{n+2}}, \quad \alpha_i, \beta_i \in \mathbf{C} \quad (*)$$

induces the family of birational maps $f_{\alpha,\beta}$ on \mathbf{P}^3 with three exceptional hypersurfaces. We say that a birational map is a pseudo-automorphism if neither a forward map nor a backward map has an exceptional hypersurface. By examining orbits of exceptional hypersurfaces, we see that if $f_{\alpha,\beta}$ is pseudo-automorphism, then f is equivalent to the case $\alpha_2 \neq 0, \beta_1 = \alpha_3 = 1, \beta_2 = \beta_3 = 0$.

We show that the only possible periods for periodic recurrences of the form $(*)$ are 8 and 12. We also discuss a one parameter family of Pseudo-Automorphisms $f_{\alpha,\beta}$ with an exponential degree growth rate. This is a joint work with Eric Bedford. (Received September 03, 2010)