A Moebius–Poincare Deconvolution Problem
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Abstract: Let $H$ be the Poincare plane on which $\text{SL}(2, \mathbb{R})$ acts on it by a Moebius transformation. Suppose that we have a random quantity $X$ on $H$, of which we only observe a version $Y$ corrupted by a random Moebius transformation $\varepsilon$ of known density $f_\varepsilon$ on $\text{SL}(2, \mathbb{R})$,

$$Y = \varepsilon X.$$

It is the objective of this work to propose a nonparametric deconvolution estimator for the density $f_X : H \to \mathbb{R}$ of $X$ based on the density $f_Y : H \to \mathbb{R}$ of $Y$. The main technique will be through the use of the Helgason-Fourier transform.