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James Eldred Pascoe* (pascoej@math.wustl.edu). *Applications of model-realization theory to inverse problems in free probability.*

Classically, Nevanlinna showed that there was bijection between positive finite Borel measures on \mathbb{R} and analytic self-maps of the upper half plane which satisfy the asymptotic condition $\lim_{s \rightarrow \infty} |sf(is)| < \infty$ via the *Cauchy transform*. More recently, analogous problems have been considered in free probability. That is, there should be a correspondence between noncommutative probability and function theory on a noncommutative upper half plane. We will discuss how to re-frame Agler model-realization theory developed on the upper half plane to completely understand the inverse problem in the free probabilistic context. This talk represents joint work with Benjamin Passer and Ryan Tully-Doyle. (Received September 13, 2016)