1137-42-161　　　　**John E. Herr*** (`jeherr@butler.edu`), **Palle E.T. Jorgensen** (`palle-jorgensen@uiowa.edu`) and **Eric S. Weber** (`esweber@iastate.edu`). *Constructions and a Characterization of Positive Matrices in the Hardy Space with Prescribed Boundary Representations.*

Using the Kaczmarz algorithm, for any singular Borel probability measure μ on the unit circle, we use a Parseval frame in $L^2(\mu)$ "dextrodual" to the sequence $\{e^{2\pi inx}\}_{n=0}^{\infty}$ to construct positive matrices in $H^2(\mathbb{D})$ that have $L^2(\mu)$ boundary function representations and are reproducing kernels with respect to those representations. For a given positive matrix K in $H^2(\mathbb{D})$ of a common form and a Borel measure μ on the unit circle, we give a characterization of when K has $L^2(\mu)$ boundary representations. This characterization is in terms of a matrix identity based on a new operator product called the Abel product. (Received February 01, 2018)