1163-47-269 **Jeffrey S Geronimo** and **Hugo J Woerdeman*** (hjw27@drexel.edu), Department of Mathematics, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104, and **Chung Y Wong**. *The autoregressive filter problem for multivariable degree one symmetric polynomials.* Preliminary report.

The multivariable autoregressive filter problem asks for a polynomial $p(z) = p(z_1, \ldots, z_f)$ without roots in the closed d-disk based on prescribed Fourier coefficients of its spectral density function $1/|p(z)|^2$. The necessary and sufficient conditions derived in this paper for the existence of a degree one symmetric polynomial reveal a major divide between the case of at most two variables vs. the the case of three or more variables. The latter involves multivariable elliptic functions, while the former only involve polynomial conditions. The three variable case is treated with more detail, and entails hypergeometric functions. (Received August 31, 2020)