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(csadosky@howard.edu, cs@scs.howard.edu), Department of Mathematics, Howard University, Washington, DC 20059-0001, and **Victor Vinnikov** (vinnikov@math.bgu.ac.il). *State Space Realization For Contractive Functions On The Bidisc.*

Realization of a contractive analytic function on the unit disc as the transfer function of a conservative input/state/output system (in short, a state space realization) is of fundamental importance for function theory, operator theory, and system theory. It can be viewed as consisting of two parts: first, we realize the function as the scattering function of a Lax–Phillips scattering system, and then we realize the scattering system as the space of trajectories of a conservative input/state/output system. Using a detailed analysis of the relationship between scattering systems with several evolutions and multidimensional conservative input/state/output systems, we carry out a similar programme for contractive analytic functions on the bidisc. The resulting proof of the state space realization theorem for contractive analytic functions on the bidisc is completely constructive. In particular, it provides a new direct proof of von Neumann’s inequality for pairs of commuting contractions (without using Ando’s dilation theorem, which follows itself as a corollary). It also enables one to derive explicit algebraic formulae for state space realizations of rational inner functions. (Received December 28, 2004)