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Gelu F Popescu* (gelu.popescu@utsa.edu). *Free Biholomorphic Functions and Operator Model Theory.*

Several results concerning the noncommutative multivariable operator theory on the unit ball of $B(\mathcal{H})^n$ are extended to noncommutative domains $\mathbf{B}_f(\mathcal{H}) \subseteq B(\mathcal{H})^n$, which are ranges of free biholomorphic functions f . We develop an operator model theory and dilation theory for $\mathbf{B}_f(\mathcal{H})$, where the associated universal model is an n -tuple $(M_{Z_1}, \dots, M_{Z_n})$ of left multiplication operators acting on a Hilbert space of formal power series. Inverse mapping theorems, noncommutative Hardy spaces, and unitary invariants such as the characteristic function and curvature invariant (associated with $\mathbf{B}_f(\mathcal{H})$) are discussed. Most of these results can be extended to noncommutative varieties in $\mathbf{B}_f(\mathcal{H})$. (Received September 06, 2011)