Nonlinear biseparating maps

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Let X, Y be topological spaces and E, F be normed spaces. Suppose that $A(X, E)$ is a vector subspace of $C(X, E)$ (space of E-valued continuous functions on X) and $A(Y, F)$ is a subspace of $C(Y, F)$. An additive map $T : A(X, E) \to A(Y, F)$ is *disjointness preserving* if

$$\|f(x)\| \cdot \|g(x)\| = 0 \text{ for all } x \in X \implies \|Tf(y)\| \cdot \|Tg(y)\| = 0 \text{ for all } y \in Y.$$

T is *biseparating* if it is a bijection and both T and T^{-1} are disjointness preserving. In this talk, I will propose a definition of "biseparating" for general nonlinear mappings. Then we will proceed to analyze the structure of biseparating maps acting on various types of function spaces (spaces of continuous functions, uniformly continuous functions, Lipschitz functions, etc).

Part of the talk is based on the PhD thesis of Xianzhe Feng, completed at NUS in 2018.

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