Infinite dimensional spaces consisting of linear and nonlinear non-injective maps

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Let A be a space of (linear or nonlinear) maps from an arbitrary set to a sequence space, and let f be a nonzero non-injective element of A. Generalizing a recent linear result, we show how to construct a closed infinite dimensional subspace of A, consisting of non-injective maps, containing f. We provide applications to spaces of linear operators between quasi-Banach spaces, to spaces of linear operators belonging to an operator ideal, and, in the nonlinear setting, to spaces of homogeneous polynomials and to spaces of Lipschitz functions on metric spaces. This is a joint work with Mikaela Aires (Universidade de São Paulo).

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