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Reduced powers as ultrapowers

The following result was inspired by a question that naturally arose in the Elliott classification program of C*-algebras, but C*-algebras will not be mentioned explicitly in the talk. Given a countable (or separable) first-order language L, there is a functor K from the category of countable (separable) L-structures into itself such that the reduced power B^∞ of B associated with the Fréchet filter is isomorphic to the ultrapower KB^U of KB assocaited to a nonprincipal ultrafilter on $\mathbb{N}$ (the Continuum Hypothesis is assumed for simplicity). The ultrafilter U can be chosen so that the exact sequence associated to the quotient map from B^∞ onto B^U,

$$0 \to c_U(B) \to B^\infty \to B^U \to 0,$$

splits. Although these conclusions can fail in some models of ZFC in which the Continuum Hypothesis fails, they have ZFC analogs that suffice for all applications.