John Bourke
Masaryk University

Weak morphisms from natural weak factorisation systems

One natural definition of weak morphism comes out of the notion of a natural weak factorisation system (NWFS). Each set of small maps in a well behaved category C freely generates a NWFS which comes equipped with a comonad Q and one then defines a *weak morphism* in C to be a morphism in the co-Kleisli category C_Q. That this notion is sensible was justified by Garner, who showed that in dimensions 2 and 3 such weak morphisms suitably agree with the established homomorphisms of bicategories and tricategories.

One difficulty with this approach is that, to calculate what such weak morphisms amount to, one should know the values of the comonad Q, and these are often hard to calculate. In the present talk I will give an alternative description of the same weak morphisms, not involving the comonad structure, and will give some applications.