LAX FACTORISATION SYSTEMS AND CATEGORIES OF PARTIAL MAPS

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Factorisation systems describe morphisms in a category by factorising them into pairs of composable morphisms. Their definition depends on a kind of orthogonality relation between morphisms, which entails the existence of some diagonal morphisms for certain squares. In this seminar we present the new notion of lax weak orthogonality between morphisms, which involves lax squares and the factorisation systems it generates. Then we will introduce lax versions of functorial and algebraic weak factorisation systems and some of their properties. These lax factorisation systems are discussed, keeping the theory of ordinary factorisation systems as a blueprint and providing useful properties. An overview of the examples of such lax factorisation systems is presented in the context of partial maps. We conclude with a discussion of general constructions of these examples and their description in the particular case of sets with partial maps.