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On the classification of p -divisible objects with a reductive structure

First we introduce the context of p -divisible objects with a reductive structure of Fontaine's category over the Witt ring of an algebraically closed field k of positive characteristic p . It generalizes the more familiar context of p -divisible groups with good families of tensors, which emerges in the study of special fibres of Shimura varieties of Hodge type. Second the main problems and some history are mentioned. Third we present the boundedness principle and few applications. Roughly speaking this principle, in the context of p -divisible groups, says: to construct a p -divisible group over k is not an infinite process but a bounded infinite process. For instance, we show that each p -divisible group of fixed rank r over k is uniquely determined by its truncation modulo some fixed power (which depends only on r) of p . Fourth we report on the proof of the generalized Manin problem in the most general Shimura sigma-crystal context. Fifth we deal we Bruhat decompositions governing isomorphism classes of reductions mod p of the mentioned p -divisible context. Sixth we mention the new types of stratifications we get in geometric contexts. Seventh, if the time remains, we report on an application of the boundedness principle to a new proof of de Jong–Oort result on the purity of stratifications by Newton polygons, in a slightly more general setting.