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Evaluating the wild Brauer group

The local-global approach to the study of rational points on varieties over number fields begins by embedding the set of rational points on a variety X into the set of its adelic points. The Brauer-Manin pairing cuts out a subset of the adelic points, called the Brauer-Manin set, that contains the rational points. If the set of adelic points is non-empty but the Brauer-Manin set is empty then we say there's a Brauer-Manin obstruction to the existence of rational points on X . Computing the Brauer-Manin pairing involves evaluating elements of the Brauer group of X at local points. If an element of the Brauer group has order coprime to p , then its evaluation at a p -adic point factors via reduction of the point modulo p . For p -torsion elements this is no longer the case: in order to compute the evaluation map one must know the point to a higher p -adic precision. Classifying p -torsion Brauer group elements according to the precision required to evaluate them at p -adic points gives a filtration which we describe using work of Bloch and Kato. Applications of our work include addressing Swinnerton-Dyer's question about which places can play a role in the Brauer-Manin obstruction. This is joint work with Martin Bright.