Dissertation Defense

Patching and local-global principles for gerbes with an application to homogeneous spaces

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Abstract: Starting in 2009, Harbater and Hartmann introduced a new patching setup for semi-global fields, establishing a patching framework for vector spaces, central simple algebras, quadratic forms and other algebraic structures. In subsequent work with Krashen, the patching framework was refined and extended to torsors and certain Galois cohomology groups. After describing this framework, we will discuss an extension of the patching equivalence to bitorsors and gerbes. Building up on these results, we then proceed to derive a characterisation of a local- global principle for gerbes and bitorsors in terms of factorization. These results can be expressed in the form of a Mayer-Vietoris sequence in non-abelian hypercohomology with values in the crossed-module $G- > Aut(G)$. After proving the local-global principle for certain bitorsors and gerbes using the characterization mentioned above, we conclude with an application on rational points for homogeneous spaces.

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