

1084-14-12

Ivan Horozov* (horozov@math.wustl.edu), Department of Mathematics, Washington University in St Louis, One Brookings Drive, St Louis, MO 63130, and **Matt Kerr**, Department of mathematics, University of Washington in St Louis, One Brookings Drive, St Louis, MO 63130.
Reciprocity Laws on Algebraic Surfaces via Iterated Integrals.

In this paper we define a new symbol, called the 4-function symbol, on a complex algebraic surface, which satisfies two types of reciprocity laws. In comparison the Parshin symbol on a surface is defined for 3 non-zero rational functions. Both the 4-function symbol and the Parshin symbol are expressed as a product of more primitive symbols, which we call bi-local symbols. They also satisfy reciprocity laws and occur naturally, when iterated integrals are used. The key technical ingredient is the notion of iterated integrals on membranes. In terms of such integrals, we not only prove reciprocity laws but we give an interpretation of the symbols as parallel transports on the loop space of a variety. Moreover, such integrals give a relation between the 4-function symbol and the Riemann curvature tensor.

The appendix contains a K -theoretic variant of the 4-function symbol, which differs by a sign. This difference causes one of the reciprocity laws to fail, suggesting that iterated integrals play an essential role in the definition of the (correct) 4-function symbol. (Received June 26, 2012)