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Yuliy Baryshnikov and **Robert Ghrist*** (ghrist@seas.upenn.edu), 200 S. 33rd St., Philadelphia, PA 19104. *Euler characteristic, integration, and definable functions*. Preliminary report.

We consider integration with respect to Euler characteristic, a well-studied subject in the intersection of geometric combinatorics and constructible sheaves, which uses the Euler characteristic as a measure. We show how to extend the integral operator to real-valued integrands which are definable with respect to an o-minimal structure. In this theory, the integral operator is no longer linear; however, it does return a weighted combination of critical values of the integrand, and thus has strong connections to Morse theory.

This talk will present this integration theory and give applications to sensor networks involving target enumeration and localization. (Received September 04, 2008)