1024-37-237 **Tetyana I. Andress** (andr@gwu.edu), Department of Mathematics, The George Washington University, Washington, DC 20052, and **E. Arthur Robinson*** (robinson@gwu.edu), Department of Mathematics, The George Washington University, Washington, DC 20052.
Cohomology and the spectrum in 1-dimensional tiling systems.

Given a 1-dimensional tiling dynamical system (a flow), the first Čech cohomology $\check{H}^1$ of the tiling space has a lot of dynamical information, but not quite enough to completely determine the spectrum of the flow. Yet there is a close connection between the spectrum and the cohomology. Since all eigenfunctions are continuous, and no two eigenfunctions (for different eigenvalues) are homotopic, it follows from the *Bruschlinski Theorem* that every eigenfunction corresponds to a unique element of $\check{H}^1$. In many cases, the eigenfunctions give a complete set of cohomology classes. Moreover, every element of the cohomology has a winding number which, in the case of an eigenfunction, is the eigenvalue. If the underlying discrete substitution satisfies the *saturation* property of Bezuglyi and Kwiatowski, then the winding number operator is 1:1, and the cohomology is represented as a subgroup $\mathbb{R}$ that contains the spectrum. (Received January 09, 2007)