TEMPLE UNIVERSITY

Department of Mathematics

Analysis Seminar

Room 617 Wachman Hall

Monday, January 30th, 2023, 2:30 p.m.

On the Lefschetz number

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Abstract: Let M be a closed n-manifold, $H^q(M)$ its de Rham cohomology groups, which are finite dimensional vector spaces. The Lefschetz number of a smooth map $f : M \to M$ is $L_f = \sum_{q=0}^{n}(-1)^q \mathrm{tr}(f_q^*)$ where $f_q^* : H^q(M) \to H^q(M)$ is the linear transformation induced by f and $\mathrm{tr}(f_q^*)$ is its trace. A theorem of Lefschetz asserts that if $L_f \neq 0$ then f has fixed points. A theorem of Atiyah and Bott gives a formula for L_f under some condition on f. I plan to review this, then describe work in progress with L. Hartmann in a certain setting in which M has singularities and the de Rham complex is replaced by a related complex.