

המחלקה למתמטיקה, בן-גוריון

lecture Special

Title: Existence of outer automorphisms of the Calkin algebra is undecidable in ZFC
Speaker: Christopher N. Phillips, University of Oregon and Ben Gurion University of the Negev

Abstract: The Calkin algebra Q is the quotient of the algebra $L(H)$ of bounded operators on a separable infinite dimensional Hilbert space H by the ideal of compact operators. It is a simple C^* -algebra, first studied by Calkin in 1941. It takes a few lines to prove that every automorphism of $L(H)$ is inner, but it is not clear whether every automorphism of Q is inner. Assuming ZFC, this is undecidable. Despite the concrete description of Q , the Hypothesis Continuum (CH), also called the Axiom of Open Coloring (OCA), proved by Todorćević (2011), shows that there are outer automorphisms of Q . In this talk, we will outline the results of both proofs. These results are accessible to people in operator algebras and set theory. We will use CH, under the assumption of the existence of outer automorphisms of Q , to reprove Farah's result that Q is not separable. We will also use the original proof of OCA, which shows the nonexistence of outer automorphisms of Q . We will say briefly about later results which have been proved, as well as some open problems involving generalizations of the Calkin algebra. We will also discuss the existence of outer automorphisms of l^p and C^* -algebras, and whether the orientation reversing automorphism of Q exists. The original Calkin algebra is consistent with ZFC.

Time: יולי 18, 11:10–13:00, 2022

(BGU) 28 Building ,104 Room :**Location**

<https://www.math.bgu.ac.il/research/events/calkin-ncphillips> :**Web**