

Mathematics Colloquium

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Iterated Antiderivative Extensions

Abstract: Let F be a differential field with an algebraically closed field of constants and let E be a differential field extension of F with no new constants. We say E is an Iterated Antiderivative Extension of F , abbreviated IAE, if there is a tower of differential fields $F = F_0 \subset F_1 \subset \cdots \subset F_n = E$ such that for $i = 1, 2, \dots, n$, $F_i = F_{i-1}(x_i)$ and $x_i \in E$ is an antiderivative of F_{i-1} . In this talk, we will show that if E is an IAE of F and K is a differential subfield of E such that $K \supseteq F$, then K is an IAE of F as well. The iterated extension generated by all iterated logarithms $\mathbb{C}(\Lambda_\infty)$ closed at each stage by translation automorphisms is an (infinite) IAE of the field of complex numbers with trivial derivation. We will compute the finitely differentially generated subfields of $\mathbb{C}(\Lambda_\infty)$.

Wednesday, September 16

4:00-5:00 pm
204 Smith Hall