

Meeting: 1003, Atlanta, Georgia, MAA CP X1, MAA General Contributed Paper Session, I

1003-X1-1017 **Fernanda Botelho** and **J. Angela Murdock*** (jmurdock@memphis.edu). *Revisiting Interval Maps with Thick Cantor Sets.*

As we explored discrete dynamical systems recently, we saw that some simple maps of the unit interval displayed their most interesting dynamics on a Cantor set. The Cantor sets that arose from classical maps like the “tent map” had zero Lebesgue measure. We asked ourselves, can one construct a map of a closed interval so that its maximal invariant set, Λ , is a Cantor set of positive Lebesgue measure? This talk outlines the construction of a sequence of piecewise linear maps that converges uniformly to a continuous map with the desired maximal invariant set. We also introduce notation that allows one to describe the dynamics of this system in terms of the measure of Λ . Next, we address the issue of the differentiability. Many different sequences of maps will converge to a continuous map with an invariant Cantor set of a given measure. Attached to each of one the sequences is a summable sequence of real numbers $\{\alpha_j\}_{j=1}^{\infty}$, where each term in the sequence represents the length of the segment “removed” from the unit interval upon the j -th iteration of the map. The remainder of the talk explores the relationship between the sequence $\{\alpha_j\}_{j=1}^{\infty}$ and the differentiability of the resulting map. (Received October 02, 2004)