

On dynamics and algebra of set-valued maps on the interval

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We study the dynamics of set-valued maps of the form $f \circ g^{-1}$ and $g^{-1} \circ f$, where $f, g: I \rightarrow I$ are continuous interval maps. Such maps arise when studying maps of inverse limits $\varprojlim\{I, f\}$ described by “diagonal” maps g . Understanding their dynamical properties provides a better understanding of inverse limit maps beyond the shift homeomorphisms (or natural extensions), given by “straight-down” maps. Additionally, the algebra of set-valued maps $f \circ g^{-1}$ and $g^{-1} \circ f$ gives information about factorization of maps into compositions, which becomes important for obtaining possible inverse limit representations of the same space and consequently constructing different planar embeddings of it. For example, it is possible to obtain a decomposition $f = f_n \circ \dots \circ f_1$ of f into continuous interval maps $f_i, i \in \{1, \dots, n\}$ (up to equivalence), directly from the graph of the set-valued map $f^{-1} \circ f$.

This is a joint work with Chris Mouron (Rhodes College, Memphis, USA).

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