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Cell Structures

A graph is a discrete set equipped with a symmetric and reflexive relation. A cell structure is an inverse system of graphs with some mild convergence conditions. We showed recently that every topologically complete space can be obtained as the perfect image of the inverse limit of a cell structure and continuous functions between topologically complete spaces are induced by cell maps between cell structures. So topologically complete spaces and their continuous mappings can be obtained by taking inverse limits of systems of discrete approximations. This work may be thought of as improving on and extending Hausdorff's completion of a metric space and Gleason's work on absolutes of compact metric spaces. Traditionally topologically complete spaces and their mappings were obtained using inverse systems or resolutions of polyhedra or ANRs. We believe our work offers advantages over the traditional approaches because we work with 0-dimensional inverse limits so we can take all diagrams in our inverse systems to be commutative unlike in the traditional approaches.

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