
LAURA SCULL, Fort Lewis College

(Lack of) Model Structure for Homotopy of Graphs

Since the introduction of discrete homotopy theories for graphs, researchers have been interested in constructing model structures for these homotopy theories. The results along this line have largely been negative and include results of [GS] for \times -homotopy and [CKK] for A -homotopy. I will discuss these results and their generalizations, and what we can learn from these results about the nature of discrete homotopy theories and their resistance to model structures.

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[GS] Goyal, S., Santhanam, R. "(Lack of) Model Structures on the Category of Graphs". *Appl Categor Struct* 29, 671–683 (2021)

[CKK] Daniel Carranza, Krzysztof Kapulkin, and Jinho Kim. "Nonexistence of Colimits in Naive Discrete Homotopy Theory". *Applied Categorical Structures* (2023).