Graph rewriting and relabeling with PBPO\(^+\): a unifying theory for quasitoposes.

Summary: We extend the powerful Pullback-Pushout (PBPO) approach for graph rewriting with strong matching. Our approach, called PBPO\(^+\), allows more control over the embedding of the pattern in the host graph, which is important for a large class of rewrite systems. We argue that PBPO\(^+\) can be considered a unifying theory in the general setting of quasitoposes, by demonstrating that PBPO\(^+\) can define a strict superset of the rewrite relations definable by PBPO, AGREE and DPO. Additionally, we show that PBPO\(^+\) is well suited for rewriting labeled graphs and some classes of attributed graphs, by introducing a lattice structure on the label set and requiring graph morphisms to be order-preserving.

MSC:
- 68Q42 Grammars and rewriting systems
- 18B25 Topoi

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