

# Frame Inference in Separation Logic via Associative-Commutative Matching

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## Abstract

Separation logic is a popular approach to concisely specifying the behaviour of programs that manipulate memory (the heap). Conciseness comes from the fact that separation logic allows the local analysis of programs, that is, it avoids the need to describe portions of the heap not altered by a command - the frame. However, the problem of identifying the frame is challenging, known as the frame inference problem, and several incomplete approaches were proposed. In this talk, I will present a polynomial algorithm to solve the frame inference problem based on transforming the problem to the well-known “distinct occurrences of AC-matching” (DO-ACM) problem. That is, finding a frame reduces to finding a matching in an undirected bipartite graph. Polynomiality is sensible to the choice of the expression language: our choice of language is standard and expressive. We illustrate our results with a simple memory model, but we believe that the results can be extended to more complex models. We show that the same approach can be used to infer the frame for incorrectness separation logic with just a small modification of the frame inference algorithm.

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