

SSA form is a very important concept in compiler internal code representation.  $\Phi$ -functions are an integral part of SSA form. Braun, Buchwald, Hack, Leißa, Mallon and Zwinkau introduce a new algorithm for SSA construction and another related algorithm for reducing the number of  $\Phi$ -functions. These algorithms are not yet implemented in the GCC compiler.

Firstly, we introduce, implement and test a basic code generation API based on the SSA construction algorithm. We list the possible extensions and usecases of the API. Then we implement the  $\Phi$  optimization as a standalone pass. We use it to measure the number of redundant  $\Phi$ -functions produced by other GCC passes. Finally, we conclude that GCC would benefit from including both of these algorithms.