

A Typed Lambda-Calculus with Patterns

Teerawat Thewmorakot and Pimpen Vejjajiva
Department of Mathematics and Computer Science, Faculty of Science,
Chulalongkorn University,
Tel.: 08-7551-4450, e-mail: teerawat.thew@hotmail.com

Abstract: From Pimpen Vejjajiva, *A Lambda-Calculus with Patterns*, an untyped lambda-calculus with patterns was introduced by adding a new class of terms, called *patterns*, into the original untyped system. This new lambda-calculus can represent functions more naturally than the original untyped system, while still satisfies all basic properties of the original lambda-calculus. However, there is a non-terminating reduction in the untyped system. This is an undesired problem in programming. In the typed system, in contrast, every reduction terminates. This property is called the *strong normalization theorem*. The typed lambda-calculus has many benefits in both Mathematics and Computer Science. In this project, we make the untyped lambda-calculus with patterns a typed one.

Keywords: Lambda-calculus, pattern, reduction, strong normalization theorem, term, type