Strong Normalization for Simply-Typed Combinatory Algebra with Non-Determinism Using Girard's Reducibility Candidates

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This document provides a formal proof of strong normalization for combinatory algebra with the two combinators S and K and a term former for non-deterministic choice. The result follows from a model construction where each type is interpreted as a reducibility candidate à la Girard. We thus demonstrate in the most simple setting that Girard's method works for non-confluend calculi. In particular, since combinatory algebra is a variable-free language, we forgo the need to define substitution. The proof has been formalized in Agda 2.6.2 and this document reproduces the commented Agda code.

Q.E.D.

Acknowledgments. This document has been generated from an Agda file using the `agda2lagda` translator and the `agda --latex` backend.