
Normal Order Reduction

An expression is reducible whenever an application has a lambda term on its left hand side. The normal order reduction proceeds by reducing from the outermost, leftmost reducible expression (“redex”) first. Lexicographically, this is usually the furthest redex to the left of an expression’s text. A more precise definition requires examining an expression’s AST, which we will do next class.

Try reducing the following two lambda expressions with a partner. Be sure to alpha reduce when appropriate in order to avoid capturing free variables. On the left, rewrite the expression. On the right, write the justification for your rewrite, e.g. “Beta reduce x for y.”

First reduction.

$(\lambda x . \lambda y . y x) x y$	given
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Second reduction.

$(\lambda f . \lambda x . f (f x)) (\lambda z . (+ x z)) 2$	given
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