

13 Types (nk480)

Consider Gödel's T, the simply-typed lambda calculus with function and natural number types, with zero, successor and iterator term formers for the natural number type.

- (a) Define a logical relation suitable for establishing the termination of closed programs in this language. [5 marks]
- (b) State the fundamental lemma for this language. [3 marks]
- (c) State formally what it means for a set of terms X to be “closed under reduction”. [2 marks]
- (d) Prove the fundamental lemma holds for the iterator case. [10 marks]