

Semantics SV2

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This set of work was partly adapted from David Berry's supervision questions.

1 Exam questions

1. 2003P6Q12
2. 2009P6Q9
3. 2018P4Q8

2 Additional questions

1. Give a grammar for types, and typing rules for functions and application, that allow only first-order functions and prohibit partial applications.
2. Do exercise 23 of the notes: prove lemma 20, the substitution lemma for L2. Please only do the cases relating to the following subset of L2 expressions:

$$e ::= x \mid \mathbf{fn} \ x : T \Rightarrow e \mid e_1 \ e_2$$

Please also assume the following lemma.

Lemma 1 (*Weakening*) *If $\Gamma \vdash e : T$ and $z \notin \text{dom}(\Gamma)$ then $\Gamma, z : T' \vdash e : T$.*

Hint: The least confusing way is to proceed by structural induction over an expression of your choice.