http://www.coli.uni-saarland.de/courses/semantics-05/

1 Elementary DRT

Consider the following text T_1 :

Mary knows a professor. He recommends a book. She reads it.

- (a) Derive a DRS K_1 for the text T_1 using the DRS construction algorithm from the lecture. You don't have to spell out every single step of the derivation, but do show some of them.
- (b) Determine the truth conditions of K_1 .
- (c) Although the text T_1 introduces several discourse referents that are available for anaphoric reference, the pronouns can't refer to all antecedents due to their genders. Specify this restriction informally. Then show how it be incorporated into the DRS representations and construction rules.
- (d) * English is different from German in that nouns in German have a grammatical gender (which can differ from the natural gender, e.g. for "das Mädchen"), and a pronoun must agree with the grammatical gender of the antecedent. Discuss the implications of this fact for DRS representations and construction rules, and try to give rules that take this situation into account.

2 Complex conditions

Consider the following text T_2 :

Mary knows a professor. If he writes a book, she doesn't read it.

- (a) Derive a DRS K_2 for the text T_2 using the DRS construction algorithm. You don't have to spell out every single step of the derivation, but do show some of them.
- (b) Determine the truth conditions of K_2 .
- (c) Try to express the truth conditions (as requirements towards the model structure) in natural language as simply as possible.
- (d) Translate K_2 into a formula of first-order predicate logic.

3 Scope Ambiguities

Consider the following text T_3 :

A professor doesn't own a book.

- (a) Give the DRS K_3 that you can construct using the DRS construction algorithm. It sufficient to show K_3 ; you don't have to go through the derivation in detail. Paraphrase the meaning of this DRS in natural language. Is this a plausible interpretation of the sentence?
- (b) As you have probably seen, T_3 contains a scope ambiguity, but the construction algorithm can only compute a single semantic representation. One naive approach to deriving the other scope readings could be to give up the "Highest Triggering Configuration" principle. Show that you can derive more scope readings if you ignore this principle, and list the DRSs that can be derived this way.
- (c) Explain why this is a bad idea, i.e. it is important to keep the "Highest Triggering Configuration" principle. Give an example sentence that shows that ignoring the principle allows you to derive DRSs with the wrong truth conditions. (The example sentence from the lecture only shows that you can derive DRSs for ill-formed texts.)

4 Mathematical texts

Consider the following text T_4 , which is a theorem of elementary geometry:

Given a line g_1 and a line g_2 , let p be a common point of g_1 and g_2 . Then there is a line k which is orthogonal neither to g_1 nor g_2 , and which doesn't go through p.

- (a) Give a DRS K_4 which represents the semantic structure of T_4 . You can write down K_4 directly; it doesn't have to be generated by applying a construction algorithm. Analyse "line" as one-place, "orthogonal to" and "go through" as two-place, and "common point of" as three-place predicates. "Given" and "let" are cues for the discourse structure and don't occur in the DRS as predicates.
- (b) Try to extend the syntax and the DRS construction rules with rules for NPs like "a line g_1 " and anaphora like " g_1 ". How could the DRS construction algorithm be modified to analyse texts with such NPs?