

5.1 (Basic DRT) Consider the following text  $T_1$ :

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

- 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.
- Determine the truth conditions of  $K_1$ : As a prerequisite, compute the conditions for a verifying embedding. Make use of the equations to simplify!
- 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 gender. Specify this restriction informally. Then show how it can be incorporated into the DRS representations and construction rules.

5.2 (Complex Conditions) Consider the following text  $T_2$ :

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

- 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.
- Interpret  $K_2$ , simplify as much as possible, and give the truth conditions.
- Translate  $K_2$  into a formula of first-order predicate logic, using the translation function from the slides.

5.3 (Free Discourse Referents) Consider the DRSs  $K_3$  and  $K_4$  for (one-sentence) texts  $T_3$  and  $T_4$ , respectively.

$T_3$  : *There is a book which Peter does not own.*

$K_3$  :  $(\{x, y\}, \{x=\text{Peter}, \text{book}(y), \neg(\emptyset, \{\text{own}(x, y)\})\})$

$T_4$  : *Peter does not own every book.*

$K_4$  :  $(\{x\}, \{x=\text{Peter}, \neg(\emptyset, \{(\{y\}, \{\text{book}(y)\}) = (\emptyset, \{\text{own}(x, y)\})\})\})$

- Determine the truth conditions for the two DRSs and compare them. Note: To determine the relation between the truth conditions, you need a bit of general mathematical reasoning.

- If the two texts are continued by "He buys it," DRS construction gives us DRSs  $K_{3+}$  as extension of  $K_3$ .

$K_{3+}$  :  $(\{x, y, u, v\}, \{x=\text{Peter}, \text{book}(y), \neg(\emptyset, \{\text{own}(x, y)\}), u=x, v=y, \text{buy}(u, v)\})$

According to accessibility constraints, DRS  $K_4$  cannot be extended because we do not find an appropriate antecedent for one of the pronouns. Explain!

- If we ignore accessibility restrictions, we could obtain  $K_{4+}$  as a result of extending  $K_4$  with "He buys it".

$K_{4+}$  :  $(\{x\}, \{x=\text{Peter}, \neg(\emptyset, \{(\{y\}, \{\text{book}(y)\}) = (\emptyset, \{\text{own}(x, y)\})\}), u=x, v=y, \text{buy}(u, v)\})$

In one respect,  $K_{4+}$  is essentially different from  $K_{3+}$ . Which?

- Compute the conditions under which an embedding  $f$  verifies  $K_{3+}$  and  $K_{4+}$ , and try to determine the truth conditions of the two DRSs. Are there any problems?