

12. Exercises for the Course 'Description Logics'

Exercise 39:

Consider the concrete domain N defined in Section 7.2 of the lecture. Show that N is admissible.

Exercise 40:

We call the composition of features feature paths. Let f_1, \dots, f_m and $g_1 \dots g_n$ be (not necessarily distinct) features. The concept constructor *feature path agreement* $(f_1 \circ f_2 \circ \dots \circ f_m) \downarrow (g_1 \circ g_2 \circ \dots \circ g_n)$ has the semantics

$$(f_1 \circ f_2 \circ \dots \circ f_m) \downarrow (g_1 \circ g_2 \circ \dots \circ g_n)^{\mathcal{I}} = \{d \in \Delta^{\mathcal{I}} \mid f_m^{\mathcal{I}}(\dots f_2^{\mathcal{I}}(f_1^{\mathcal{I}}(a)) = g_n^{\mathcal{I}}(\dots g_2^{\mathcal{I}}(g_1^{\mathcal{I}}(a)))\}.$$

Show that for the DL that extends \mathcal{ALC} with feature path agreements, satisfiability w.r.t. general TBoxes is undecidable.