Dissertation Notes

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1 XOR parser recipe shown using an example

1. Given input file that looks as follows:
   ϕ = father(x) $\neq$ Adam $\Rightarrow$ mother(x) $\neq$ Beth

2. Convert functions into relations:
   $\neg$ father(x,Adam) $\Rightarrow$ $\neg$ mother(x,Beth)

3. Retrieve domain D = {Adam, Beth}

4. Ground with rank k=0 w.r.t. domain D:
   Ground model:
   domain D 2 {Beth,Adam}
   $\neg$ mother(Adam,Beth) $\vee$ father(Adam,Adam)
   $\neg$ mother(Beth,Beth) $\vee$ father(Beth,Adam)

5. Perform RGND(ϕ) = GND(ϕ,0) $\cup$ {$\neg$ mother(Bob,Beth) $\vee$ father(Bob,Adam)}.
   Here, rank k=1, Bob is an arbitrary constant chosen from N-{Adam, Beth}, thus, now D = {Adam, Beth, Bob}:

   $\neg$ mother(Adam,Beth) $\vee$ father(Adam,Adam)
   $\neg$ mother(Beth,Beth) $\vee$ father(Beth,Adam)
   $\neg$ mother(Bob,Beth) $\vee$ father(Bob,Adam)

6. Perform XOR(ϕ) = RGND(ϕ) $\cup$ {XOR(t,D): t $\in$ T} T = {father(Adam), father(Beth), father(Bob), mother(Adam), mother(Beth), mother(Bob)}:

   XOR(ϕ) = ($\neg$ mother(Adam,Beth) $\vee$ father(Adam,Adam)) $\wedge$ ($\neg$ mother(Beth,Beth) $\vee$ father(Beth,Adam)) $\wedge$ ($\neg$ mother(Bob,Beth) $\vee$ father(Bob,Adam)) $\wedge$ (father(Adam, Adam) $\vee$ father(Beth,Adam) $\vee$ father(Bob,Adam)) $\wedge$ (mother(Adam,Beth) mother(Beth,Beth) $\vee$ mother(Bob,Beth))

   The above is an expected output.