Automated Reasoning: Errata

Chapter "Propositional Logic"

- Page 8: The following sentences is no longer true as truth constants are now part of the language: "Note that the symbol $\bot$, representing contradiction, or falsity, is not part of our language of propositional logic." Similar statments are made later in the context of resolution.
- Page 9, Definition of natural deduction: the rule for truth constant $\top$ is missing.
- Page 11, Theorem 2.3: "propositional axioms" $\rightarrow$ "propositional atoms"

Chapter "Syntax and Semantics of First-Order Logic"

- Page 15: The language contains also the truth constants $\bot$ and $\top$.

Chapter "Soundness and Completenss of First-Order Logic"

- Page 24, Corollary 4.2. Change the definition of $c^{\mathcal{J}}$ as follows: "For any individual constant c, we set $c^{\mathcal{J}}$ such that $f(c^{\mathcal{J}}) = c^{\mathcal{I}}$"
- Page 32, Equation (4.2): "Π_2" $\rightarrow$ "Π_1".
- Page 36, extended the proof by the following paragraph: "In sum, there exists a collection of sets S admitting the satisfaction properties. Furhtermore from the assumption that there exists no interpolation for the sentence $A \rightarrow C$, we conclude that $\{A, \neg C\} \in S$. Thus by model existence $\{A, \neg C\}$ is satisfiable. However then $A \rightarrow C$ cannot be valid. This shows the existence of an interpolant for $A \rightarrow C$."

Chapter "Normal Forms and Herbrand's Theorem"

- Page 46, the equivalence axioms E should read:

$$\forall x\ x \fallingdotseq x \wedge \forall x \forall y\ (x \fallingdotseq y \rightarrow y \fallingdotseq x) \wedge \forall x \forall y \forall z\ ((x \fallingdotseq y \wedge y \fallingdotseq z) \rightarrow x \fallingdotseq z)\ .$$

Chapter "Towards Automated Reasoning for First-Order Logic"

- Page 70. The definition of H_n should read as follows:

$$H_0 := \begin{cases} \{c \mid c \text{ is a constant in } \mathcal{L}\} & \exists \text{ constants in } \mathcal{L} \\ \{c\} & \text{otherwise} \end{cases}$$
$$H_{n+1} := \{f(t_1, \ldots, t_k) \mid f^k \in \mathcal{L}, t_1, \ldots, t_k \in H_n\}$$

- Page 71. The definition of the splitting rule should be as follows: "The rule consists in splitting $\mathcal{C}'$ into $\mathcal{C}'_1 := \{A'_1, \ldots, A'_n\} \cup \mathcal{D}$ and $\mathcal{C}'_2 := \{B'_1, \ldots, B'_m\} \cup \mathcal{D}$, where A'_i is the result of deleting L from A_i and B'_j is the result of deleting $\neg L$ from B_j."
- Page 87: adapt definition of NNF: "A formula is in NNF, if it does not contain implication, and every negation signs occur directly in front of an atomic formula."
- Page 88: drop the indices in the condition "$\forall x_1, \ldots, \forall x_n <_A \exists y$"
- Page 89: Proof of Theorem 10.18: "$E \wedge (\exists \vec{x}(E \wedge F) \to F\{\ldots, x_i \to f_i(\vec{y}), \ldots\}$" $\to$ "$A \wedge (\exists \vec{x}(E \wedge F) \to F\{\ldots, x_i \to f_i(\vec{y}), \ldots\})$"
- Page 89: Add the following condition before the observation on splittings: "Suppose that each conjunction E_i contains at least one of the variables from $\overline{x}$."

Automated Reasoning with Equality

- Page 99: "$r \to_{\mathcal{R}} u$" $\to$ $t \to_{\mathcal{R}} u$; "$s[u] \to_{\mathcal{R}} t$" $\to$ $s[u] = t$
- Page 100: "the literal $L[t]\sigma'$ is maximal with respect to $D\sigma'$" $\to$ "the literal $L[s']\sigma'$ is maximal with respect to $D\sigma'$"
- Page 102: "For the equality resolution rule: σ is a mgu of s and t, and $(s \neq t)\sigma$ is strictly maximal with respect to $C\sigma$." $\to$ "For the equality resolution rule: σ is a mgu of s and t, and $(s \neq t)\sigma$ is maximal with respect to $C\sigma$."