Problem

The proof of Lemma 2.41 says that (q, x) is a *looping situation* for a DPDA P if when P is started in state q with x ? Γ

Step-by-step solution

Step 1 of 4

A language Q is said to be **decidable** if a Turing machine (which is also called as decider) M exists in which Q **is accepted** and **halts on every string input.** A language, that is decidable, is also known as a recursive language**.**

• Now, consider a string l, then for any string l , there exist the following condition:

- $l \in Q \Rightarrow M$, **Halts in a state of accepting**.
- $l \notin Q \Rightarrow M$, **halts in a state of non-accepting.**

It is also known that "each language which is decidable is also **Turing-acceptable**".

Comment

Step 2 of 4

It is already known that "A looping condition for a DPDA (Deterministic Push Down Automata) P is (q, x) if state q is the starting point of P with $x \in \Gamma$ which exists on the stack's top and everything under x is never popped. Also, an input symbol is never be read".

• The above given problem of looping can be solved by identifying the looping situation. In other words," only in which no further inserted symbol is ever read and re-programming DPDA. Therefore, instead of looping, it rejects and reads the input.

Comment

Step 3 of 4

The situation arises above, produces a halt situation. The following algorithm explained it more carefully:

T ="On input $\langle B \rangle$, where B is DFA:

1. Initial state of B is marked.
2. Repeat this till a marked on new state:
3. Mark a position on which a **transition exists** in to it from anyother state which is marked already.
4. If none of the state is marked as accepted state, it will be **accepted**; otherwise, **rejected**"

The above algorithm produces a halt situation for accept and non-accept state.

Comments (3)

Step 4 of 4

Now consider **a language** F**, which is defined as** $F = \{\langle P, q, x \rangle \mid (q, x)$ **is a situation of looping for** P $\}$**.** Therefore, from the above discussion it can be said that **"the above given language** F **is a decidable language".**

Comment