The Theory of Computation
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Solution Manual
Chapter 3, Problem 3.3

- The quotient L/L_2 is by definition the set $\{x \mid \exists y \in L_2, xy \in L\}$. Since L_2 includes ε, we can choose $y = \varepsilon$ and thus conclude that the quotient includes the subset $\{x \mid x\varepsilon \in L\}$, which is just the set $\{x \mid x \in L\}$, which is L itself.
- The quotient Σ^*/L is by definition the set $\{x \mid \exists y \in L, xy \in \Sigma^*\}$, which is just the set $\{x \mid \exists y \in L\}$—because the last requirement is met by any string. But that set is either the empty set (when L is empty) or the universe (when L is not empty).
- The quotient L/Σ^* is by definition the set $\{x \mid \exists y \in \Sigma^*, xy \in L\}$, that is, the set of strings that can be completed through the concatenation of any string at all into a string of L—the definition of the set of prefixes of the language L.