2. Does the expression \(((0 + 1) (0 + 1)^{*}) 00 (0 + 1)^{*}\) denote the language in Example 3.5?

4. Find a regular expression for the set \(\{a^n b^m : n \geq 3, m \text{ is even}\}\).

5. Find a regular expression for the set \(\{a^n b^m : (n + m) \text{ is even}\}\).

6. Give regular expressions for the following languages.
   \(L_1 = \{a^n b^m, n \geq 4, m \leq 3\}\).

   (c) The complement of \(L_1\).

10. Give a regular expression for \(L = \{a^n b^m : n \geq 1, m \geq 1, nm \geq 3\}\).

13. Find a regular expression for \(L = \{vwv : v, w \in \{a, b\}^*, |v| = 2\}\).

16. Give regular expressions for the following languages on \(\Sigma = \{a, b, c\}\).
   (a) all strings containing exactly one \(a\),
   (b) all strings containing no more than three \(a\)'s,
   (c) all strings that contain at least one occurrence of each symbol in \(\Sigma\).

17. Write regular expressions for the following languages on \(\{0, 1\}\).
   (a) all strings ending in 01,
   (b) all strings not ending in 01,
   (c) all strings containing an even number of 0's,

18. Find regular expressions for the following languages on \(\{a, b\}\).
   (a) \(L = \{w : |w| \mod 3 = 0\}\).
   (b) \(L = \{w : n_a (w) \mod 3 = 0\}\).

23. For the case of a regular expression \(r\) that does not involve \(\lambda\) or \(\varnothing\), give a set of necessary and sufficient conditions that \(r\) must satisfy if \(L(r)\) is to be infinite.

25. In Exercise 24, what are sufficient conditions on the expression so that the picture is a closed contour in the sense that the beginning and ending points are the same? Are these conditions also necessary?

26. Find an nfa that accepts the language \(L(\cdot a^* (a + b))\).

27. Find a regular expression that denotes all bit strings whose value, when interpreted as a binary integer, is greater than or equal to 40.