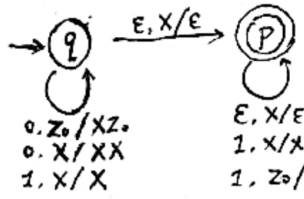
形式语言与自动机 第九周作业

习题 6.1.1

(b)



$(q, 0011, Z_0) \vdash (q, 011, XZ_0) \vdash (q, 11, XXZ_0) \begin{cases} \vdash (p, 11, XZ_0) \begin{cases} \vdash (p, 1, XXZ_0) - ② \\ \vdash (q, 1, XXZ_0) \end{cases} \\ \vdash (p, 011, Z_0) \end{cases}$

$\vdash (p, 11, Z_0)$ - ①

$\vdash (q, \varepsilon, XXZ_0)$ - ③

$\vdash (p, 1, XZ_0)$ (下方已有)

① $\vdash (p, 1, \varepsilon)$

② $\begin{cases} \vdash (p, \varepsilon, XXXZ_0) \\ \vdash (p, 1, XZ_0) \end{cases} \begin{cases} \vdash (p, \varepsilon, XXZ_0) \vdash (p, \varepsilon, XZ_0) \vdash (p, \varepsilon, Z_0) \\ \vdash (p, 1, Z_0) \vdash (p, \varepsilon, \varepsilon) \end{cases}$

③ $\vdash (q, \varepsilon, XZ_0)$ (上方已有)

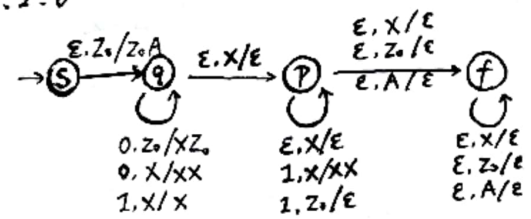
所有ID为 $(q, 0011, Z_0)$ $(q, 011, XZ_0)$ $(q, 11, XXZ_0)$ $(p, 011, Z_0)$
$(p, 11, XZ_0)$ $(q, 1, XXZ_0)$ $(p, 11, Z_0)$ $(p, 1, XXZ_0)$
(q, ε, XXZ_0) $(p, 1, \varepsilon)$ $(p, \varepsilon, XXXZ_0)$ $(p, 1, XZ_0)$
(p, ε, XXZ_0) (p, ε, XZ_0) (p, ε, Z_0) $(p, 1, Z_0)$ $(p, \varepsilon, \varepsilon)$

习题 6.2.5

(b) $\vdash (q_0, abb, Z_0) \vdash (q_1, bb, AAZ_0) \vdash (q_1, b, AZ_0) \vdash (q_1, \varepsilon, Z_0)$
$\vdash (q_0, \varepsilon, Z_0) \vdash (f, \varepsilon, \varepsilon)$

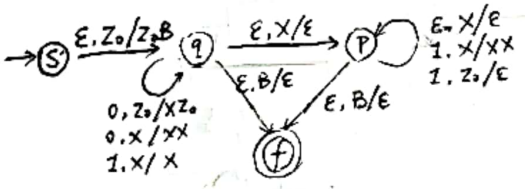
习题 6.2.6

(a)



$P_1 = (\{Q = S, q, p, f\}, \Sigma = \{0, 1\}$
$\Gamma = \{X, Z_0, A\}, \delta, S, Z_0)$
即为所求

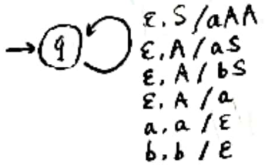
(b)



$P_2 = (\{Q = S, q, p, f\}$
$\Sigma = \{0, 1\}, \Gamma = \{X, Z_0, B\}$
$\delta, S, Z_0, \{f\})$
即为所求

习题 6.2.2

$S \to aAA$
$A \to aS \mid bS \mid a$



$P = (\{Q = q\}, \Sigma = \{a, b\}$
$\Gamma = \{S, A, a, b\}, \delta,$
$q, S)$ 的空栈型PDA
即为所求

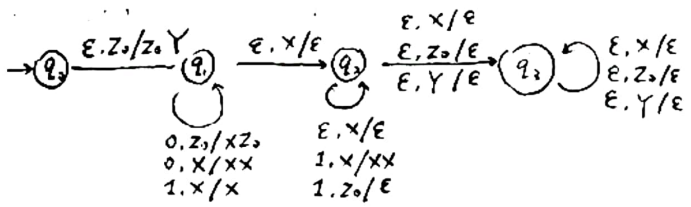
$\delta(q, \varepsilon, S) = \{(q, aAA)\}$
$\delta(q, \varepsilon, A) = \{(q, aS), (q, bS), (q, a)\}$
$\delta(q, a, a) = \{(q, \varepsilon)\}$
$\delta(q, b, b) = \{(q, \varepsilon)\}$

习题 6.3.4　　$Q=\{q_0,q_1,q_2,q_3\}$　$\Gamma=\{X,Y,Z_0\}$

$V=\{S\}\cup\{[q_iAq_j]\mid q_i,q_j\in Q,A\in\Gamma\}$.

$\Sigma=\{0,1\}$.

P 如下



$S\to[q_0Z_0q_i]$ ($q_i\in Q$)

$[q_1Xq_2]\to\varepsilon$
$[q_2Xq_3]\to\varepsilon$
$[q_2Z_0q_2]\to 1$
$[q_2Xq_2]\to\varepsilon$
$[q_2Z_0q_3]\to\varepsilon$
$[q_2Yq_3]\to\varepsilon$
$[q_3Xq_3]\to\varepsilon$
$[q_3Z_0q_3]\to\varepsilon$
$[q_3Yq_3]\to\varepsilon$

$[q_0Z_0q_i]\to\varepsilon[q_1Z_0q_j][q_jYq_i]$
$[q_1Z_0q_i]\to 0[q_1Xq_j][q_jZ_0q_i]$
$[q_1Xq_i]\to 0[q_1Xq_j][q_jXq_i]$
$[q_1Xq_i]\to 1[q_1Xq_i]$
$[q_2Xq_i]\to 1[q_2Xq_j][q_jXq_i]$　(以上 $q_i,q_j\in Q$)

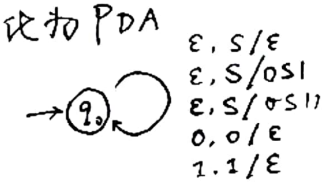
(V, Σ, P, S) 即为所求

习题 6.3.5

(c) 先给出一个 CFG.

$S\to 0S1\mid 0S11\mid\varepsilon$

转化为 PDA



$\delta(q_0,\varepsilon,S)=\{(q_0,\varepsilon),(q_0,0S1),(q_0,0S11)\}$
$\delta(q_0,0,0)=\{(q_0,\varepsilon)\}$
$\delta(q_0,1,1)=\{(q_0,\varepsilon)\}$

$P=(Q=\{q_0\},\ \Sigma=\{0,1\},\ \Gamma=\{S,0,1\},\ \delta,\ q_0,\ S)$

的空栈型 PDA 即为所求