$$\delta\left(q_s,\ a_1 \ldots a_k\right) \in \left\{\left(q_p\ ,\ b_1 \ldots b_k,\ c_1 \ldots c_k\ \right)\right\}$$

$x_1 \ldots x_k,\ b_1 \ldots b_k \in \Gamma$

$c_1 \ldots c_k\ \in \{-1,\ 0,\ 1\}$

$$\delta\left(q_{s10},\ \begin{matrix} x_1 \\ \vdots \\ x_{k+1} \end{matrix}\right) \in \left\{\left(q_{s10},\ \begin{matrix} x_1 \\ \vdots \\ x_{k+1} \end{matrix},\ -1\right)\right\}$$

$$\delta\left(q_{s10},\ \beta\ \right) \in \left\{\left(q_{s11},\ \beta\ ,1\right)\right\}$$

$$\delta\left(q_{s11},\ \begin{matrix} x_1 \\ 0 \\ x_3 \\ \vdots \\ x_{k+1} \end{matrix}\right) \in \left\{\left(q_{s11},\ \begin{matrix} x_1 \\ 0 \\ x_3 \\ \vdots \\ x_{k+1} \end{matrix},\ 1\right)\right\}$$

$$\delta\left(q_{s11},\ \begin{matrix} a_1 \\ 0 \\ x_3 \\ \vdots \\ x_{k+1} \end{matrix}\right) \in \left\{\left(q_{s11a_1},\ \begin{matrix} a_1 \\ 0 \\ x_3 \\ \vdots \\ x_{k+1} \end{matrix},\ 0\right)\right\}$$

$$\vdots$$

$$\delta\left(q_{sk1a_1 \ldots a_{k-1}},\ \begin{matrix} a_k \\ x_2 \\ \vdots \\ x_k \\ 1 \end{matrix}\right) \in \left\{\left(q_{s13a_1 \ldots a_k},\ \begin{matrix} a_k \\ x_2 \\ \vdots \\ x_k \\ 1 \end{matrix},\ 0\right)\right\}$$

$$\vdots$$

$$\delta\left(q_{sh4a_1 \ldots a_k},\ \begin{matrix} a_h \\ x_2 \\ \vdots \\ 1_{h+1} \\ \vdots \\ x_{k+1} \end{matrix}\right) \in \left\{\left(q_{sh5a_1 \ldots a_k},\ \begin{matrix} b_h \\ x_2 \\ \vdots \\ 0_{h+1} \\ \vdots \\ x_{k+1} \end{matrix},\ c_h\right)\right\} \qquad \forall\ h \in \{1..k\}$$

$$\delta\left(q_{sh5a_1 \ldots a_k},\ \begin{matrix} x_1 \\ x_2 \\ \vdots \\ 0_{h+1} \\ \vdots \\ x_{k+1} \end{matrix}\right) \in \left\{\left(q_{s\ h+1\ 3a_1 \ldots a_k},\ \begin{matrix} x_1 \\ x_2 \\ \vdots \\ 1_{h+1} \\ \vdots \\ x_{k+1} \end{matrix},\ 0\right)\right\} \qquad \forall\ h \in \{1..k\text{-}1\}$$

$$\delta\left(q_{sk5a_1 \ldots a_k},\ \begin{matrix} x_1 \\ \vdots \\ x_k \\ 0_{k+1} \end{matrix}\right) \in \left\{\left(q_{p10},\ \begin{matrix} x_1 \\ \vdots \\ x_k \\ 1_{k+1} \end{matrix},\ 0\right)\right\}$$

Definícia 1

Nedeterministický VTS je 7-tica

$$M = (K, \Sigma, \Gamma, \delta, q_0, F, k)$$

kde **K,** Σ**,** Γ**,** $\mathbf{q_0}$**, F** sú ako v nedeterministickom turingovom stroji (ďalej len NTS), **k** je počet hláv a

$$\delta: K \times \Gamma^k \rightarrow 2^{K \times (\Gamma - \{B\})^k \times \{-1,0,1\}^k}$$

Definícia 2

Konfigurácia VTS je k+1 -tica

$$K \times (\Gamma - \{B\})^* \times N^k$$

pre $(q, w, i_1 \ldots i_k)$ platí $0 = i_m = |w|+1$, pričom $1 \leq k \leq m$

Definícia 3

Krok výpočtu VTS je relácia $\vdash$ na konfiguráciach definovaná takto: $(q, a_1 \ldots a_n, i_1 \ldots i_k) \vdash (p, b_1 \ldots b_n, j_1 \ldots j_k)$ práve vtedy, keď

$$\delta(q, a_{i_1} \ldots a_{i_k}) \ni (p, b_{i_1} \ldots b_{i_k}, j_1 - i_1 \ldots j_k - i_k)$$

pričom $a_m = b_m \quad \forall m \neq i_r \quad 1 \leq r \leq k$

Definícia 4

Jazyk akceptovaný VTS **M** je **L(M)**

$$L(M) = \{w \in \Sigma^* \mid (q_0, w, 1 \ldots 1) \vdash^* (q, w', i_1 \ldots i_k),\ q \in F\}$$