Effective length of column

Length of column $l_c := 6\ m$

$$\mu_i(U, R) := \begin{array}{l}
\text{if } U_0 = \text{“fixed”} \wedge R_0 = \text{“free”} \wedge \left(U_1 = \text{“fixed”} \wedge R_1 = \text{“free”}\right) \\
\quad 1 \\
\text{else if } U_0 = \text{“free”} \wedge R_0 = \text{“free”} \wedge \left(U_1 = \text{“fixed”} \wedge R_1 = \text{“fixed”}\right) \\
\quad 2 \\
\text{else if } U_0 = \text{“fixed”} \wedge R_0 = \text{“fixed”} \wedge \left(U_1 = \text{“free”} \wedge R_1 = \text{“free”}\right) \\
\quad 2 \\
\text{else if } U_0 = \text{“fixed”} \wedge R_0 = \text{“free”} \wedge \left(U_1 = \text{“fixed”} \wedge R_1 = \text{“fixed”}\right) \\
\quad 0.7 \\
\text{else if } U_0 = \text{“fixed”} \wedge R_0 = \text{“fixed”} \wedge \left(U_1 = \text{“fixed”} \wedge R_1 = \text{“free”}\right) \\
\quad 0.7 \\
\text{else if } U_0 = \text{“fixed”} \wedge R_0 = \text{“free”} \wedge \left(U_1 = \text{“fixed”} \wedge R_1 = \text{“lim”}\right) \\
\quad 0.9 \\
\text{else if } U_0 = \text{“fixed”} \wedge R_0 = \text{“lim”} \wedge \left(U_1 = \text{“fixed”} \wedge R_1 = \text{“free”}\right) \\
\quad 0.9 \\
\text{else if } U_0 = \text{“lim”} \wedge R_0 = \text{“free”} \wedge \left(U_1 = \text{“fixed”} \wedge R_1 = \text{“fixed”}\right) \\
\quad 1.5 \\
\text{else if } U_0 = \text{“fixed”} \wedge R_0 = \text{“fixed”} \wedge \left(U_1 = \text{“lim”} \wedge R_1 = \text{“free”}\right) \\
\quad 1.5 \\
\text{else if } U_0 = \text{“lim”} \wedge R_0 = \text{“free”} \wedge \left(U_1 = \text{“lim”} \wedge R_1 = \text{“fixed”}\right) \\
\quad 2 \\
\text{else if } U_0 = \text{“lim”} \wedge R_0 = \text{“fixed”} \wedge \left(U_1 = \text{“lim”} \wedge R_1 = \text{“free”}\right) \\
\quad 2 \\
\text{else if } U_0 = \text{“fixed”} \wedge R_0 = \text{“fixed”} \wedge \left(U_1 = \text{“fixed”} \wedge R_1 = \text{“fixed”}\right) \\
\quad 0.5 \\
\text{else if } U_0 = \text{“fixed”} \wedge R_0 = \text{“lim”} \wedge \left(U_1 = \text{“fixed”} \wedge R_1 = \text{“lim”}\right) \\
\quad 0.8 \\
\text{else if } U_0 = \text{“lim”} \wedge R_0 = \text{“fixed”} \wedge \left(U_1 = \text{“lim”} \wedge R_1 = \text{“fixed”}\right) \\
\quad 0.8 \\
\text{else if } U_0 = \text{“lim”} \wedge R_0 = \text{“lim”} \wedge \left(U_1 = \text{“lim”} \wedge R_1 = \text{“lim”}\right) \\
\quad 1.2 \\
\text{else} \\
\quad \text{“undefined”}
\end{array}$$

$Point_x$	U_{ix}	R_{ix}
“Top”	“fixed”	“free”
“Bottom”	“fixed”	“fixed”

$$\mu_x := \mu_i\left(U_{ix}, R_{ix}\right) = 0.7$$

$$st_x := \left\| \begin{array}{l} \text{if } U_{ix_0} = \text{“fixed”} \wedge R_{ix_0} = \text{“free”} \wedge \left(U_{ix_1} = \text{“fixed”} \wedge R_{ix_1} = \text{“free”}\right) \\ \quad \| \; s \leftarrow \text{“def”} \\ \text{else if } U_{ix_0} = \text{“free”} \wedge R_{ix_0} = \text{“free”} \wedge \left(U_{ix_1} = \text{“fixed”} \wedge R_{ix_1} = \text{“fixed”}\right) \\ \quad \| \; s \leftarrow \text{“def”} \\ \text{else if } U_{ix_0} = \text{“fixed”} \wedge R_{ix_0} = \text{“fixed”} \wedge \left(U_{ix_1} = \text{“free”} \wedge R_{ix_1} = \text{“free”}\right) \\ \quad \| \; s \leftarrow \text{“def”} \\ \text{else} \\ \quad \| \; s \leftarrow \text{“indef”} \\ s \end{array} \right\| = \text{“indef”}$$

$Point_y$	U_{iy}	R_{iy}
“Top”	“fixed”	“free”
“Bottom”	“fixed”	“fixed”

$$\mu_y := \mu_i\left(U_{ix}, R_{ix}\right) = 0.7$$

$$st_y := \left\| \begin{array}{l} \text{if } U_{iy_0} = \text{“fixed”} \wedge R_{iy_0} = \text{“free”} \wedge \left(U_{iy_1} = \text{“fixed”} \wedge R_{iy_1} = \text{“free”}\right) \\ \quad \| \; s \leftarrow \text{“def”} \\ \text{else if } U_{iy_0} = \text{“free”} \wedge R_{iy_0} = \text{“free”} \wedge \left(U_{iy_1} = \text{“fixed”} \wedge R_{iy_1} = \text{“fixed”}\right) \\ \quad \| \; s \leftarrow \text{“def”} \\ \text{else if } U_{iy_0} = \text{“fixed”} \wedge R_{iy_0} = \text{“fixed”} \wedge \left(U_{iy_1} = \text{“free”} \wedge R_{iy_1} = \text{“free”}\right) \\ \quad \| \; s \leftarrow \text{“def”} \\ \text{else} \\ \quad \| \; s \leftarrow \text{“indef”} \\ s \end{array} \right\| = \text{“indef”}$$