$$v_{53}=\left\{\begin{pmatrix}0&0&2\\0&2&0\\2&0&2\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}2&0&2\\0&2&0\\2&0&2\end{pmatrix}\right\},\quad v_{54}=\left\{\begin{pmatrix}1&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&0\end{pmatrix}\right\},$$

$$v_{55}=\left\{\begin{pmatrix}1&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&1\end{pmatrix}\right\},\quad v_{56}=\left\{\begin{pmatrix}1&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&2\end{pmatrix}\right\},$$

$$v_{57}=\left\{\begin{pmatrix}1&0&0\\0&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}0&0&1\\0&1&0\\1&0&0\end{pmatrix}\right\},\quad v_{58}=\left\{\begin{pmatrix}1&0&0\\0&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}0&0&1\\0&1&0\\1&0&1\end{pmatrix}\right\},$$

$$v_{59}=\left\{\begin{pmatrix}1&0&0\\0&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}0&0&1\\0&1&0\\1&0&2\end{pmatrix}\right\},\quad v_{60}=\left\{\begin{pmatrix}1&0&0\\0&0&0\\0&0&2\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}0&0&2\\0&2&0\\2&0&0\end{pmatrix}\right\},$$

$$v_{61}=\left\{\begin{pmatrix}1&0&0\\0&0&0\\0&0&2\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}0&0&2\\0&2&0\\2&0&1\end{pmatrix}\right\},\quad v_{62}=\left\{\begin{pmatrix}1&0&0\\0&0&0\\0&0&2\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}0&0&2\\0&2&0\\2&0&2\end{pmatrix}\right\},$$

$$v_{63}=\left\{\begin{pmatrix}1&0&1\\0&1&0\\1&0&0\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&0&0\\0&0&0\end{pmatrix}\right\},\quad v_{64}=\left\{\begin{pmatrix}1&0&1\\0&1&0\\1&0&0\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&0&0\\0&0&1\end{pmatrix}\right\},$$

$$v_{65}=\left\{\begin{pmatrix}1&0&1\\0&1&0\\1&0&0\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&0&0\\0&0&2\end{pmatrix}\right\},\quad v_{66}=\left\{\begin{pmatrix}1&0&1\\0&1&0\\1&0&1\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\\1&0&0\end{pmatrix}\right\},$$

$$v_{67}=\left\{\begin{pmatrix}1&0&1\\0&1&0\\1&0&1\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\\1&0&1\end{pmatrix}\right\},\quad v_{68}=\left\{\begin{pmatrix}1&0&1\\0&1&0\\1&0&1\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\\1&0&2\end{pmatrix}\right\},$$

$$v_{69}=\left\{\begin{pmatrix}1&0&1\\0&1&0\\1&0&2\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}1&0&2\\0&2&0\\2&0&0\end{pmatrix}\right\},\quad v_{70}=\left\{\begin{pmatrix}1&0&1\\0&1&0\\1&0&2\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}1&0&2\\0&2&0\\2&0&1\end{pmatrix}\right\},$$

$$v_{71}=\left\{\begin{pmatrix}1&0&1\\0&1&0\\1&0&2\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}1&0&2\\0&2&0\\2&0&2\end{pmatrix}\right\},\quad v_{72}=\left\{\begin{pmatrix}1&0&2\\0&2&0\\2&0&0\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}2&0&0\\0&0&0\\0&0&0\end{pmatrix}\right\},$$

$$v_{73}=\left\{\begin{pmatrix}1&0&2\\0&2&0\\2&0&0\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}2&0&0\\0&0&0\\0&0&1\end{pmatrix}\right\},\quad v_{74}=\left\{\begin{pmatrix}1&0&2\\0&2&0\\2&0&0\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}2&0&0\\0&0&0\\0&0&2\end{pmatrix}\right\},$$

$$v_{75}=\left\{\begin{pmatrix}1&0&2\\0&2&0\\2&0&1\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}2&0&1\\0&1&0\\1&0&0\end{pmatrix}\right\},\quad v_{76}=\left\{\begin{pmatrix}1&0&2\\0&2&0\\2&0&1\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}2&0&1\\0&1&0\\1&0&1\end{pmatrix}\right\},$$

$$v_{77}=\left\{\begin{pmatrix}1&0&2\\0&2&0\\2&0&1\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}2&0&1\\0&1&0\\1&0&2\end{pmatrix}\right\},\quad v_{78}=\left\{\begin{pmatrix}1&0&2\\0&2&0\\2&0&2\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}2&0&2\\0&2&0\\2&0&0\end{pmatrix}\right\},$$

$$v_{79}=\left\{\begin{pmatrix}1&0&2\\0&2&0\\2&0&2\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}2&0&2\\0&2&0\\2&0&1\end{pmatrix}\right\},\quad v_{80}=\left\{\begin{pmatrix}1&0&2\\0&2&0\\2&0&2\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}2&0&2\\0&2&0\\2&0&2\end{pmatrix}\right\},$$

$$v_{81}=\left\{\begin{pmatrix}2&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&0\end{pmatrix}\right\},\quad v_{82}=\left\{\begin{pmatrix}2&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&1\end{pmatrix}\right\},$$

$$v_{83}=\left\{\begin{pmatrix}2&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&0\\0&0&2\end{pmatrix}\right\},\quad v_{84}=\left\{\begin{pmatrix}2&0&0\\0&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}0&0&1\\0&1&0\\1&0&0\end{pmatrix}\right\},$$

$$v_{85}=\left\{\begin{pmatrix}2&0&0\\0&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}0&0&1\\0&1&0\\1&0&1\end{pmatrix}\right\},\quad v_{86}=\left\{\begin{pmatrix}2&0&0\\0&0&0\\0&0&1\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}0&0&1\\0&1&0\\1&0&2\end{pmatrix}\right\},$$

$$v_{87}=\left\{\begin{pmatrix}2&0&0\\0&0&0\\0&0&2\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}0&0&2\\0&2&0\\2&0&0\end{pmatrix}\right\},\quad v_{88}=\left\{\begin{pmatrix}2&0&0\\0&0&0\\0&0&2\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}0&0&2\\0&2&0\\2&0&1\end{pmatrix}\right\},$$

$$v_{89}=\left\{\begin{pmatrix}2&0&0\\0&0&0\\0&0&2\end{pmatrix}\begin{pmatrix}0&0&0\\0&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}0&0&2\\0&2&0\\2&0&2\end{pmatrix}\right\},\quad v_{90}=\left\{\begin{pmatrix}2&0&1\\0&1&0\\1&0&0\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&0&0\\0&0&0\end{pmatrix}\right\},$$

$$v_{91}=\left\{\begin{pmatrix}2&0&1\\0&1&0\\1&0&0\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&0&0\\0&0&1\end{pmatrix}\right\},\quad v_{92}=\left\{\begin{pmatrix}2&0&1\\0&1&0\\1&0&0\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}1&0&0\\0&0&0\\0&0&2\end{pmatrix}\right\},$$

$$v_{93}=\left\{\begin{pmatrix}2&0&1\\0&1&0\\1&0&1\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\\1&0&0\end{pmatrix}\right\},\quad v_{94}=\left\{\begin{pmatrix}2&0&1\\0&1&0\\1&0&1\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\\1&0&1\end{pmatrix}\right\},$$

$$v_{95}=\left\{\begin{pmatrix}2&0&1\\0&1&0\\1&0&1\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}1&0&1\\0&1&0\\1&0&2\end{pmatrix}\right\},\quad v_{96}=\left\{\begin{pmatrix}2&0&1\\0&1&0\\1&0&2\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}1&0&2\\0&2&0\\2&0&0\end{pmatrix}\right\},$$

$$v_{97}=\left\{\begin{pmatrix}2&0&1\\0&1&0\\1&0&2\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}1&0&2\\0&2&0\\2&0&1\end{pmatrix}\right\},\quad v_{98}=\left\{\begin{pmatrix}2&0&1\\0&1&0\\1&0&2\end{pmatrix}\begin{pmatrix}0&1&0\\1&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}1&0&2\\0&2&0\\2&0&2\end{pmatrix}\right\},$$

$$v_{99}=\left\{\begin{pmatrix}2&0&2\\0&2&0\\2&0&0\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}2&0&0\\0&0&0\\0&0&0\end{pmatrix}\right\},\quad v_{100}=\left\{\begin{pmatrix}2&0&2\\0&2&0\\2&0&0\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}2&0&0\\0&0&0\\0&0&1\end{pmatrix}\right\},$$

$$v_{101}=\left\{\begin{pmatrix}2&0&2\\0&2&0\\2&0&0\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&0\\0&0&0\end{pmatrix}\begin{pmatrix}2&0&0\\0&0&0\\0&0&2\end{pmatrix}\right\},\quad v_{102}=\left\{\begin{pmatrix}2&0&2\\0&2&0\\2&0&1\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}2&0&1\\0&1&0\\1&0&0\end{pmatrix}\right\},$$

$$v_{103}=\left\{\begin{pmatrix}2&0&2\\0&2&0\\2&0&1\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}2&0&1\\0&1&0\\1&0&1\end{pmatrix}\right\},\quad v_{104}=\left\{\begin{pmatrix}2&0&2\\0&2&0\\2&0&1\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&1\\0&1&0\end{pmatrix}\begin{pmatrix}2&0&1\\0&1&0\\1&0&2\end{pmatrix}\right\},$$

$$v_{105}=\left\{\begin{pmatrix}2&0&2\\&2&0\\2&0&2\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}2&0&2\\0&2&0\\2&0&0\end{pmatrix}\right\},\quad v_{106}=\left\{\begin{pmatrix}2&0&2\\&2&0\\2&0&2\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}2&0&2\\0&2&0\\2&0&1\end{pmatrix}\right\},$$

$$v_{107}=\left\{\begin{pmatrix}2&0&2\\&2&0\\2&0&2\end{pmatrix}\begin{pmatrix}0&2&0\\2&0&2\\0&2&0\end{pmatrix}\begin{pmatrix}2&0&2\\0&2&0\\2&0&2\end{pmatrix}\right\},$$

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B. The Determinative Systems of Gliders

The corresponding decimal code sets of determinative systems $\mathcal{B}_j$, $j = 1, \ldots, 6$ are presented.

1. For the glider a, the determinative system is

$$\mathcal{B}_1 == \left\{\left\{\begin{pmatrix} 0 & k_1 & 0 \\ k_1 & 0 & k_2 \\ 0 & k_2 & 0 \end{pmatrix} \middle/ \begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \middle/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix}\right\}; \left\{\begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \middle/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix} \middle/ \begin{pmatrix} k_2 & 0 & k_3 \\ 0 & k_3 & 0 \\ k_3 & 0 & k_4 \end{pmatrix}\right\}\right\},$$

$k_i = 0, n_1, n_2, n_3, n_4$ and $i = 1, 2, 3, 4$, where

$n_1 = 157\,301\,732\,472\,753\,487\,872,$

$n_2 = 382\,914\,066\,129\,277\,157\,376,$

$n_3 = 307\,109\,474\,942\,224\,171\,008,$

$n_4 = 87\,838\,209\,750\,016\,720\,896.$

2. For the glider b, the determinative system is

$$\mathcal{B}_2 == \left\{\left\{\begin{pmatrix} 0 & k_1 & 0 \\ k_1 & 0 & k_2 \\ 0 & k_2 & 0 \end{pmatrix} \middle/ \begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \middle/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix}\right\}; \left\{\begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \middle/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix} \middle/ \begin{pmatrix} k_2 & 0 & k_3 \\ 0 & k_3 & 0 \\ k_3 & 0 & k_4 \end{pmatrix}\right\}\right\},$$

$k_i = 0, n_1, n_2, n_3, n_4$ and $i = 1, 2, 3, 4$, where

$n_1 = 1\,426\,112\,365\,437\,110\,779\,069\,669\,048\,320,$

$n_2 = 1\,441\,199\,759\,666\,120\,901\,651\,836\,436\,480,$

$n_3 = 71\,248\,204\,819\,881\,517\,263\,855\,747\,960\,355\,907\,987\,296\,380 \ddots$
$518\,400,$

$n_4 = 71\,248\,204\,820\,918\,315\,100\,583\,069\,735\,449\,887\,616\,897\,216 \ddots$
$675\,840.$

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3. For the glider c, the determinative system is

$$\mathcal{B}_3 == \left\{\left\{\begin{pmatrix} 0 & k_1 & 0 \\ k_1 & 0 & k_2 \\ 0 & k_2 & 0 \end{pmatrix} \middle/ \begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \middle/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix}\right\};\right. \\ \left.\left\{\begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \middle/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix} \middle/ \begin{pmatrix} k_2 & 0 & k_3 \\ 0 & k_3 & 0 \\ k_3 & 0 & k_4 \end{pmatrix}\right\}\right\},$$

$k_i = 0,\ n_1,\ n_2$ and $i = 1, 2, 3, 4$, where

$$n_1 = 1\,737\,652\,812\,531\,576\,869\,185\,173\,538\,735\,313\,197\,061\,298\because \\ 377\,740\,063\,979\,195\,810\,709\,504,$$

$$n_2 = 107\,839\,992\,356\,672\,231\,205\,423\,157\,951\,804\,061\,011\,470\,513\because \\ 723\,684\,758\,003\,267\,634\,462\,720.$$

4. For the glider d, the determinative system is

$$\mathcal{B}_4 == \left\{\left\{\begin{pmatrix} 0 & k_1 & 0 \\ k_1 & 0 & k_2 \\ 0 & k_2 & 0 \end{pmatrix} \middle/ \begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \middle/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix}\right\};\right. \\ \left.\left\{\begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \middle/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix} \middle/ \begin{pmatrix} k_2 & 0 & k_3 \\ 0 & k_3 & 0 \\ k_3 & 0 & k_4 \end{pmatrix}\right\}\right\},$$

$k_i = 0,\ n_1,\ n_2$ and $i = 1, 2, 3, 4$, where

$$n_1 = 162\,264\,707\,324\,156\,913\,662\,044\,271\,542\,272,$$

$$n_2 = 10\,384\,594\,273\,175\,548\,853\,037\,316\,624\,613\,376.$$

5. For the glider e, the determinative system is

$$\mathcal{B}_5 == \left\{\left\{\begin{pmatrix} 0 & k_1 & 0 \\ k_1 & 0 & k_2 \\ 0 & k_2 & 0 \end{pmatrix} \middle/ \begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \middle/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix}\right\};\right. \\ \left.\left\{\begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \middle/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix} \middle/ \begin{pmatrix} k_2 & 0 & k_3 \\ 0 & k_3 & 0 \\ k_3 & 0 & k_4 \end{pmatrix}\right\}\right\},$$

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$k_i = 0, n_1, n_2, n_3$ and $i = 1, 2, 3, 4$, where

$n_1 = 89\,530\,297\,364\,923\,605\,508\,146\,705\,664\,818\,118\,918\,144,$

$n_2 = 539\,231\,843\,434\,284\,405\,901\,976\,779\,735\,939\,138\,261\,719\,529 \ddots$
$625\,828\,884\,104\,490\,338\,222\,080,$

$n_3 = 539\,231\,843\,434\,159\,220\,014\,183\,401\,125\,745\,276\,163\,384\,563 \ddots$
$987\,138\,183\,581\,413\,285\,036\,032.$

6. For the glider f, the determinative system is

$$\mathcal{B}_6 == \left\{\left\{\begin{pmatrix} 0 & k_1 & 0 \\ k_1 & 0 & k_2 \\ 0 & k_2 & 0 \end{pmatrix} \Big/ \begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \Big/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix}\right\};\right.$$
$$\left.\left\{\begin{pmatrix} k_1 & 0 & k_2 \\ 0 & k_2 & 0 \\ k_2 & 0 & k_3 \end{pmatrix} \Big/ \begin{pmatrix} 0 & k_2 & 0 \\ k_2 & 0 & k_3 \\ 0 & k_3 & 0 \end{pmatrix} \Big/ \begin{pmatrix} k_2 & 0 & k_3 \\ 0 & k_3 & 0 \\ k_3 & 0 & k_4 \end{pmatrix}\right\}\right\},$$

$k_i = 0, n_1, n_2, n_3$ and $i = 1, 2, 3, 4$, where

$n_1 = 42\,187\,411\,976\,088\,540\,494\,546\,617\,854\,066\,688,$

$n_2 = 1\,098\,980\,723\,400\,879\,481\,039\,162\,633\,706\,099\,850\,677\,091\,041 \ddots$
$280,$

$n_3 = 1\,673\,237\,945\,072\,905\,942\,430\,424\,223\,935\,627\,264.$

References

[1] E. R. Berlekamp, J. H. Conway, and R. K. Guy, *Winning Ways for Your Mathematical Plays*, Vol. 2, London, New York: Academic Press, 1982.

[2] M. Gardner, "Mathematical Games: The Fantastic Combinations of John H. Conway's New Solitaire Game 'Life'," *Scientific American*, **223**, 1970 pp. 120–123.

[3] M. Gardner, "On Cellular Automata, Self-Replication, the Garden of Eden and the Game 'Life'," *Scientific American*, **224**(2), 1971 pp. 112–117.

[4] W. Poundstone, *The Recursive Universe*, 1st ed. (computer consultation by R. T. Wainwright), New York: Morrow, 1985.

[5] P. Bak, C. Tang, and K. Wiesenfeld, "Self-Organized Criticality: An Explanation of the 1/*f* Noise," *Physical Review Letters*, **59**(4), 1987 pp. 381–384. doi:10.1103/PhysRevLett.59.381.

[6] P. Bak, K. Chen, and M. Creutz, "Self-Organized Criticality in the 'Game of Life'," *Nature*, **342**(6251) 1989 pp. 780–782. doi:10.1038/342780a0.

[7] P. Bak, "Self-Organized Criticality in Non-conservative Models," *Physica A: Statistical Mechanics and Its Applications*, **191**(1–4) 1992 pp. 41–46. doi:10.1016/0378-4371(92)90503-I.

[8] J. B. C. Garcia, M. A. F. Gomes, T. I. Jyh, T. I. Ren, and T. R. M. Sales, "Nonlinear Dynamics of the Cellular-Automaton 'Game of Life'," *Physical Review E*, **48**(5), 1993 pp. 3345–3351. doi:10.1103/PhysRevE.48.3345.

[9] P. Rendell, "A Simple Universal Turing Machine for the Game of Life Turing Machine," *Journal of Cellular Automata*, **6**(4–5), 2011 pp. 323–340.

[10] P. Rendell, "A Fully Universal Turing Machine in Conway's Game of Life," *Journal of Cellular Automata*, **8**(1–2), 2013 pp. 19–38.

[11] S. M. Reia and O. Kinouchi, "Conway's Game of Life Is a Near-Critical Metastable State in the Multiverse of Cellular Automata," *Physical Review E*, **89**(5), 2014 052123. doi:10.1103/PhysRevE.89.052123.

[12] C. Bays, "A Note on the Game of Life in Hexagonal and Pentagonal Tessellations," *Complex Systems*, **15**(3), 2005 pp. 245–252. http://www.complex-systems.com/pdf/15-3-4.pdf.

[13] N. Owens and S. Stepney, "The Game of Life Rules on Penrose Tilings: Still Life and Oscillators," in *Game of Life Cellular Automata* (A. Adamatzky, ed.), London: Springer-Verlag, 2005 pp. 331–378.

[14] K. Imai, T. Hatsuda, V. Poupet, and K. Sato, "A Universal Semi-Totalistic Cellular Automaton on Kite and Dart Penrose Tilings," in *Automota & JAC 2012,* La Marana, Corsica, France, 2012 pp. 267–278.

[15] H. J. Blok and B. Bergersen, "Synchronous versus Asynchronous Updating in the 'Game of Life'," *Physical Review E*, **59**(4), 1999 pp. 3876–3879. doi:10.1103/PhysRevE.59.3876.

[16] J. Lee, S. Adachi, F. Peper, and K. Morita, "Asynchronous Game of Life," *Physica D: Nonlinear Phenomena*, **194**(3–4), 2004 pp. 369–384. doi:10.1016/j.physd.2004.03.007.

[17] Ch.-A. Gandin, J.-L. Desbiolies, M. Rappaz, and Ph. Thevoz, "A Three-Dimensional Cellular Automaton Finite Element Model for the Prediction of Solidification Grain Structures," *Metallurgical and Materials Transactions A*, **30**(12), 1999 pp. 3153–3165. doi:10.1007/s11661-999-0226-2.

[18] Z. F. Zhou, Q. A. Huang, W. H. Li, and W. Lu, "A Novel 3-D Dynamic Cellular Automata Model for Photoresist-Etching Process Simulation," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, **26**(1), 2007 pp. 100–114. doi:10.1109/TCAD.2006.882510.

[19] Y. B. Mo, B. Ren, W. C. Yang, and J. W. Shuai, "The 3-Dimensional Cellular Automata for HIV Infection," *Physica A: Statistical Mechanics and Its Applications*, **399**(1), 2014 pp. 31–39. doi:10.1016/j.physa.2013.12.018.

https://doi.org/10.25088/ComplexSystems.25.1.51

[20] L. Saucedo-Mora and T. J. Marrow, "3D Cellular Automata Finite Element Method with Explicit Microstructure: Modeling Quasi-Brittle Fracture Using Meshfree Damage Propagation," *Procedia Materials Science*, **3**, 2014 pp. 1143–1148. doi:10.1016/j.mspro.2014.06.186.

[21] M. C. Marinack, Jr. and C. Fred Higgs, III, "Three-Dimensional Physics-Based Cellular Automata Model for Granular Shear Flow," *Powder Technology*, **277**, 2015 pp. 287–302. doi:10.1016/j.powtec.2015.02.057.

[22] A. M. del Rey and G. R. Sánchez, "An Image Encryption Algorithm Based on 3D Cellular Automata and Chaotic Maps," *International Journal of Modern Physics C*, **26**(1), 2015 1450069. doi:10.1142/S0129183114500697.

[23] C. Bays, "Candidates for the Game of Life in Three Dimensions," *Complex Systems*, **1**(3), 1987 pp. 373–400. http://www.complex-systems.com/pdf/01-3-1.pdf.

[24] C. Bays, "A New Candidate Rule for the Game of Three-Dimensional Life," *Complex Systems*, **6**(5), 1992 pp. 433–441. http://www.complex-systems.com/pdf/06-5-3.pdf.

[25] C. Bays, "A Note about the Discovery of Many New Rules for the Game of Three-Dimensional Life," *Complex Systems*, **16**(4), 2006 pp. 381–386. http://www.complex-systems.com/pdf/16-4-7.pdf.

[26] Z. L. Zhou, *Symbolic Dynamics*, Shanghai: Shanghai Scientific and Technological Education Publishing House, 1997.

[27] B. P. Kitchens, *Symbolic Dynamics: One-Sided, Two-Sided, and Countable State Markov Shifts*, New York: Springer, 1998.

https://doi.org/10.25088/ComplexSystems.25.1.51