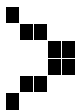


Appendix III -- Bugs

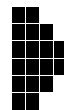
Range 2 bug collection

The following bugs are examples from the range two hyperspace described in Chapter 7. The rule that generates the bug is listed first, then the bug's period τ and the vector \vec{v} which determines its direction. Below each example is a picture of the bug at time zero.

- $(2, 4, 4, 4, 4), \tau = 2, \vec{v} = 3e_1$



- $(2, 5, 6, 5, 5), \tau = 4, \vec{v} = 4e_1$



- $(2, 5, 5, 6, 7), \tau = 12, \vec{v} = 8e_1$



- $(2, 6, 8, 6, 6), \tau = 1, \vec{v} = e_1$



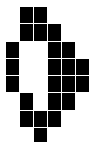
- $(2, 6, 7, 6, 8), \tau = 30, \vec{v} = e_1 + e_2$



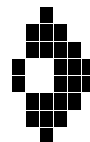
- $(2, 7, 9, 7, 10), \tau = 3, \vec{v} = e_1 + e_2$



- $(2, 8, 11, 8, 13), \tau = 2, \vec{v} = e_1$



- $(2, 9, 13, 9, 15), \tau = 2, \vec{v} = e_1$



Assorted Bugs

The following examples describe the dynamics that emerge when the exactly θ , $\theta = 2\rho$ LtL rules with ρ odd are run on an initial state consisting of the Λ depicted in Proposition 7.2.3.

Example 1. Exactly θ , range 7, $\theta = 14$. This is a bug maker that makes a replicator-generator. It takes 16 time steps for the bug maker to make a replicator-generator. This pattern continues, in spite of the generator, that appears at time 26, for the 1-dimensional replicator that appears at time 42. The bug maker creates bugs behind it that serve to protect it from the outermost copy of the replicator. Each of these bugs creates a generator for a replicator, however, none of the replicators are able to kill off the bug maker.

Example 2. Exactly θ , range 3, $\theta = 6$. In this case, a couple of bug makers are made, but destroy each other. In the end just three period 4 bugs survive, each moving in the horizontal direction; two go east and the other west.

Example 3. Exactly θ , range 11, $\theta = 22$. This yields a period 6 bug that becomes very complicated at intermediate time steps.

Example 4. Exactly θ , range 9, $\theta = 18$. This yields a period 10 bug that becomes very complicated at intermediate time steps. One of the phases is the initial seed with the addition of a 3×2 rectangle trailing behind it.