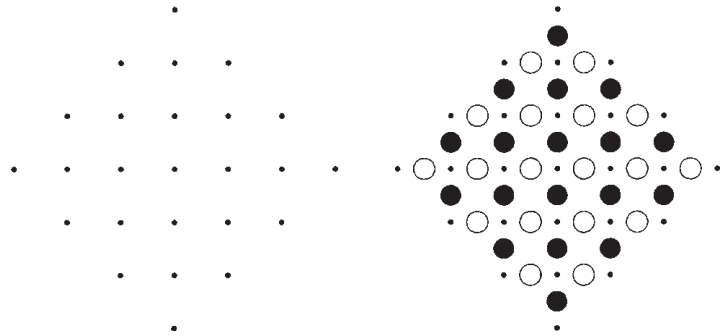
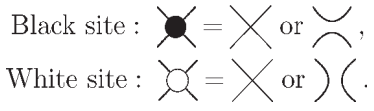


Fig. 3. The (1-3-5-7-5-3-1) dot pattern of the diamond Kolam (left) and the superposition of the dot pattern and the B/W checker pattern lattice (right).

The closed line simply means no ends. The first rule mentions the crossing, but its order is generally not questionable because the patterns are usually drawn by fine granular objects. The second rule prescribes the basic paths for the line-drawings, which also implies that the paths are smooth short-cuts connecting the middle points nearest to each other. The rule further means that any other point of the edges are not allowed to be passed. In practice, the uncrossed two neighbouring lines are not exactly passing through the middle points of the edges but rather through their neighbourhood points. Nonetheless, we define them as above to simplify the rules. The third rule restricts or attracts the paths just around the dots. With the rules, we have basically six patterns of lines around a dot (Fig. 2). The one-line drawing should also be defined here: a single closed smooth line with some self-crossings. It is intrinsically different from but historically influenced by the definition of Euleric curves. Note that, being inspired by NAGATA and YANAGISAWA (2004), NAGATA and THAMBURAJ (2006) and Yanagisawa (private communications, 2006), we further focus on the diamond shaped grid pattern of dots, the diamond Kolam which was mentioned in the previous section.

Now, we are ready to translate Problem 2.1 defined on a grid pattern of dots into a problem on a checker-pattern lattice. According to Rules 2.2, the vertex positions of the drawing (including crossings) are restricted to the neighbourhoods of the middle points of the edges. The rules further separate the possible vertices into two types: one is just below the dots (we call this 'black site') and the other is just aside the dots ('white site'). Then, one obtains the alternating B/W checker pattern lattice, somehow dual to the original (Fig. 3). The black site takes either 'cross' or 'cup and cap', while the white takes either 'cross' or 'recoil':



(1)