1114-57-72 **Seungsang Oh*** (seungsang@korea.ac.kr), Department of Mathematics, Korea University, Seoul, 02841, South Korea, and **Kyungpyo Hong** (kphong@nims.re.kr), National Institute for Mathematical Sciences, Daejeon, 305-811, South Korea. *Lattice Model Enumeration by the State Matrix Recursion Algorithm.* Preliminary report.

In this talk, we introduce the state matrix recursion algorithm. This algorithm proceeds with recurrence relations of state matrices, which turn out to be remarkably efficient for the enumeration of two-dimensional regular lattice models such as polymers (especially dimers and trimers), independent vertex and edge sets, trominoes, squares with various sizes, multiple self-avoiding walks and polygons, and quantum knot mosaics in a rectangular region. These enumerations are deep and difficult combinatorial problems in lattice statistics and have long been studied by probabilists, physicists and computer scientists alike. This new algorithm is demonstrated by an application to the general monomer–dimer problem in an $m \times n$ square lattice, on providing a recursive formula for the partition function with respect to the monomer activity (or the matching polynomial). From this partition function, we extract the enumeration of close-packed dimer configurations and single boundary monomer configurations, and generalize to the weighted monomer–dimer partition function. (Received August 08, 2015)