MR Number:MR3472192
Author: Brocchi, S.; Massazza, P.
Title:A new sandpile model with smoothness assumptions. (English summary)
Journal Reference: *Fund. Inform.* 143 (2016), no. 3-4, 261-286, 26 pp.
Primary classification: 37B15
Secondary classification(s): 68Q05, 68Q80, 82C20

Review text:

The starting point of this article is the Sand Pile Model SPM(n) introduced by Goles and Kiwi [E. Goles; M. A. Kiwi, Theoret. Comput. Sci. 115 (1993), no. 2, 32134; MR1224440] as a specialization of Brylawski's model [T. Brylawski, Discrete Mathematics. 1973;6(3):201 219; MR0325405]. In this model, a total number of sandgrains n initially stacked on a single column $i = 1$ evolve according to a simple dynamical rule: At each time step, a grain can fall from column i to column $i + 1$ if the height difference is at least 2. Thus, the elements of SPM(n) are (suitable) partitions of the integer n, the states of the system being non-increasing sequences of integers representing the number of grains in each column.

The authors introduce two new granular systems called the 'smooth' Sand Pile Model SmSPM(n) and an extension of it, denoted by SmSPM*(n). These models are derived from SPM(n) by means of an additional smoothness condition based on a potential that describes the relative heigths of adjacent columns: only moves from sites where this potential is maximal are allowed. The authors provide a characterization of the reachable states, together with some interesting properties of the resulting lattices.

Reviewed by Vladimir García-Morales