Abstract

In the *sandpile model*, we are given an undirected graph G and an initial list of chip counts on each vertex of G and we may fire degree(v) chips from any vertex v to its neighbors. Doing chip moves either results in a unique terminal configuration or recurs forever. On many families of graphs – including trees – the problem of computing the final configuration is P-complete and simulation can take as long as $\Theta(n^3)$ time. We give a $O(n \log^5 n)$ time algorithm for trees that computes the terminal configuration or shows that chip firing will not terminate.