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**Jiajun Hoo\*** (jiajun.hoo@gmail.com). *Chip-Firing in Abelian Sandpiles.*

Chip-firing processes, and the ideas of self-organized criticality related to chip-firing, contain information of significance to several scientific fields. For example, self-organized criticality can be used to model and understand pink noise (also known as  $\frac{1}{f}$  noise). Moreover, this same idea of self-organized criticality can be used to describe seemingly complex phenomena such as the stock market, or cranial neural activity. This paper discusses, in particular, the Abelian Sandpile model and related groups. In particular, we are interested in the identity of such groups under sandpile addition, in both typical sandpiles and sandpiles with chip-firing rules constructed using non-trivial arithmetic structures. We explore the Sandpile Groups related to the class of cyclic graphs  $\mathcal{C}_n$ , and further characterize the number of elements of each Sandpile Group relating to the graph with various sinks with reference to the associated arithmetic structure. (Received September 12, 2019)