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On Some Properties of Pebbling Configuration Graphs.

Consider a configuration S_G of pebbles on a simple, connected graph G . For $m, k \in \mathbb{N}$, $k < m$, an (m, k) pebbling move removes m pebbles from a vertex in $V(G)$ and adds k pebbles to an adjacent vertex. A context $\Sigma = \{(m, k) \mid m, k \in \mathbb{N} \text{ and } k < m\}$ is the set of allowable pebbling moves on a graph with given configuration. A configuration graph $[S_G]_\Sigma$ associated with a configuration S_G is a Hasse diagram whose vertices represent subsequent configurations that can be reached from S_G , and whose edges correspond to a single pebbling move in Σ . We show that $[S_G]_\Sigma$ is bipartite with girth 4 for all Σ and prove under what conditions $[S_G]_\Sigma \cong [S_H]_\Sigma$ for simple, connected graphs G and H . Furthermore, we prove for which configurations $[S_G]_\Sigma$ is a symmetrical Hasse diagram and which sub-configurations are associated with subgraphs of $[S_G]_\Sigma$. Finally, we address the question: When is $[S_G]_\Sigma$ pebbleable? (Received September 24, 2018)