

1125-I1-2745

Kurt E. Ludwick* (keludwick@salisbury.edu), Department of Mathematics & Computer Science, Salisbury University, 1101 Camden Avenue, Salisbury, MD 21801. *Recurrence Relations for Melodies and Tilings*. Preliminary report.

We consider the number of distinct melodies that can be written subject to specified restrictions, such as the number of pitch classes and allowed lengths of notes and/or rests. If x_n denotes the number of allowable melodies of length n beats, it turns out that the sequence $\{x_n\}$ is generated by a recurrence relation, the equation for which depends on said restrictions.

Certain versions of this problem are isomorphic to well-known combinatorial “tiling” problems. In particular, there is an obvious one-to-one correspondence between the following:

- Melodies of length n beats using specified note lengths and pitch classes
- Tilings of length n cells using tiles of specified lengths and colors

On the other hand, if we allow our melodies to include *rests*, then the tiling analogy breaks down in a subtle but significant way, resulting in a different family of recurrence relations which (to the best of my knowledge!) has no well-known combinatorial analog. We will discuss recurrence relations for counting melodies which include rests, along with an analogous variation on the tiling problem. (Received September 20, 2016)