1145-VP-2984 **Bernd Sing*** (`dr.bernd.sing@gmail.com`), Department of Mathematics, University of the West Indies, Cave Hill, Bridgetown, St Michael BB11000, Barbados. *Kolakoski sequences and Chvatals sequence of graphs.* Preliminary report.

An infinite sequence z over the alphabet $\{1,2\}$ that equals its own run-length sequence, is called a Kolakoski-sequence (OEIS #`A000002`):

$$z \;=\; \underbrace{1}_{1}\;\; \underbrace{22}_{2}\;\; \underbrace{11}_{2}\;\; \underbrace{2}_{1}\;\; \underbrace{1}_{1}\;\; \underbrace{22}_{2}\;\; \begin{matrix}\ldots \\ \ldots\end{matrix} \;=\; z.$$

Although it is conjectured that the letter frequencies are equal in the infinite sequence (i.e., half the letters are 1s and half of them 2s), it is not even know if the frequencies actually exist.

Seeking to understand this mysterious sequences better, one can consider sequences that equal their own run-length sequence over other alphabets with two letters: For alphabets consisting of two even or two odd numbers, one can easily calculate the limiting frequencies; in the case of one even and one odd number, one arrives at the same conjecture about the letter frequencies as for the alphabet $\{1,2\}$.

In order to find bounds on the letter frequencies, Vašek Chvátal considered a certain recursively defined sequence of digraphs $(G_d)_d$ obtained from the Kolakoski sequence under consideration. We study the structure and adjacency matrices of these graphs over various alphabets. (Received September 26, 2018)