Jean-Marc Deshouillers. Automatic questions concerning the representation of $n!$ in base b.

Abstract. We shall first recall a joint work with Florian Luca showing that the automaticity of the "final nonzero digits" of $n!$ written in base 4 leads to the density of the integers n for which $n!$ is a sum of three squares.

The sequence A008904 from the On-line Encyclopedia of Integer Sequences gives the "final nonzero digit" of $n!$ written in the base 10, studied at least some fifty years ago by Kakutani. The comments on this entry indicate that this sequence, which contains only the four digits $2, 4, 6, 8$ for $n \geq 2$, is an "automatic sequence" and the given computation illustrates the fact that the four above mentioned digits occur with the same frequency.

We shall present some results due to Imre Ruzsa and myself on the same question related to the base 12, where some special feature occurs. We shall also report a joint work in progress, with Greg Dresden (W&L) and Shanta Laishram (ISI Delhi), concerning the case of a general base b.