1041-05-23   **Mireille Bousquet-Mélou*** (`bousquet@labri.fr`), 345 cours de la Libération, 33405 Talence Cedex, France. *Prudent self-avoiding walks.*

Prudent self-avoiding walks

A walk on the square lattice is self-avoiding (SA) if it never visits twice the same vertex. The enumeration of SA-walks is notoriously difficult, though intriguing asymptotic conjectures exist.

Several authors have independently defined prudent SAW. A SAW is prudent if it can be obtained from a shorter one by adding a new step in such a way this step can be repeated indefinitely without hitting an already visited point.

Four families of prudent SAW, of increasing generality, can be defined in a natural way. The first class has a rational generating function. The second class was shown by Duchi (2005) to have an algebraic GF. We count walks of the third class, and prove that their GF is not D-finite (in particular, not algebraic).

The fourth class is that of all prudent SAW: we give a functional equation for their GF, which remains unsolved. However, this equation suggests to consider an analogous model of prudent SAW on the triangular lattice, which we solve exactly: again, the GF is shown to be non-D-finite.

We also study average properties of long prudent walks, like the end-to-end distance. (Received July 11, 2008)