

About the cover

No surprises from Catalan's constant

This month's cover was suggested by the article in this issue written by David H. Bailey *et alia*. It exhibits two ways to portray 1,000,000 “digits” taken from somewhere in the base 4 expansion of the Catalan constant. In the foreground on the cover is the track of a random walk based on the expansion, with 0 equal to a step right, 1 a step up, etc. It is colored red at the start and dark blue at the end. In the background these digits are laid out, top to bottom and left to right, as shaded pixels.

The track of the random walk overlays three pseudo-random walks in pastel colors, and the behavior of the digits' track is not visibly inconsistent with a random distribution. At first this might not seem like an interesting way to look at such an expansion, but the article “Walking on real numbers”, written by Jon Borwein *et al.* and published recently in the *Mathematical Intelligencer*, demonstrates that it can often reveal interesting information. It sometimes leads to curious patterns—as for example, the walk illustrated below (redrawn from an image in that article), based on the binary expansion

0.10111111011...

of the concatenation of successive primes 2, 3, 5, 7, 11.... This is known to be a normal number, but the expansion does not appear otherwise to be very random.



We thank Jon Borwein and Fran Aragon for supplying us with the expansion of the Catalan constant, as well as helpful comments.

—Bill Casselman
Graphics Editor
(notices-covers@ams.org)