

Today. A riddle on spheres, Charlene's project, Etienne's project, a more efficient Jones algorithm.

Topics (in no particular order). Whatever you may suggest; whatever comes to my mind; **the Fibonacci numbers**; **the Catalan numbers**; **the Jones polynomial**; **a more efficient Jones algorithm**; **a riddle on spheres**; Khovanov homology; Γ -calculus; the Hopf fibration; Hilbert's 13th problem; non-commutative Gaussian elimination; free Lie algebras; the Baker-Campbell-Hausdorff formula; wacky numbers; an order 4 torus; the Schwarz Lantern; knot colourings; the Temperley-Lieb pairing; the dodecahedral link; sound experiments; barycentric subdivisions; a Peano curve; braid closures and Vogel's algorithm; the insolubility of the quintic; phase portraits; the Mandelbrot set; shadows of the Cantor aerogel; quilt plots; some image transformations; De Bruijn graphs; the Riemann series theorem; finite type invariants and the Willerton fish.

Pensieve header: October 6: A riddle on spheres.

A great riddle. 2^n **yellow unit balls** are centered at the vertices of the n -dimensional cube $\{-1, 1\}^n$. Let B_n be the largest **blue ball** centered at 0 bound by the yellow balls, and let C_n be the smallest **red cube** bounding the yellow balls. Compute $\lim_{n \rightarrow \infty} \frac{\text{Vol}(B_n)}{\text{Vol}(C_n)}$.

```
Graphics3D[{
  Red, Opacity[0.2], Cuboid[{-2, -2, -2}, {2, 2, 2}],
  Yellow, Opacity[0.5], Table[Sphere[c, 1], {c, Tuples[{1, -1}, 3]}],
  Blue, Opacity[1], Sphere[{0, 0, 0}, Sqrt[3] - 1]
}, Boxed -> False]
```

