Lecture 15, Friday w8, 2014-11-07

As people were arriving, I outlined Todd Ebert's 'hat puzzle', MacKay Exercise 13.24, p222. Non-examinable!

Today's lecture we saw how to achieve rates at close to the capacity for the erasure channel with random linear codes. We also saw digital fountains, a practical approach to packet-based communication. The slides have the details.

Check your progress

Why do we need to know the noise-level of the channel in advance to design a random linear block code? How does the digital fountain approach side-step this issue?

You'll have to understand the digital fountain decoder to do the assignment. Once you've done that, you may want to verify its properties following the experiments in MacKay's book. (My guess is some other time than right now.)

Recommended reading

We've covered the 'week 7' slides, except the final mention of Reed–Solomon, which I'll do later. Mark anything that's unclear or that needs expanding on NB.

I can't immediately find a simple treatment of random linear codes for the erasure channel in the book. Ask on the slides if anything is unclear! Chapter 14 has a more general treatment of random linear codes. Any details beyond what I said (most of the chapter) are non-examinable.

MacKay Chapter 50 (p588–) gives a much fuller treatment of Digital Fountain codes than I had time for. It's a shame I didn't have time to go into some of the motivation covered into this Chapter. Some of the ideas for applications seem really neat, and the chapter is fairly easy going, so it's recommended.