MANY CHEERFUL FACTS

presents

The Salamander Lemma

a talk by Anton Geraschenko

13:10 – 14:00 on Thursday, October 4, in room 1015.

Some common results are proved by "diagram chasing," a process which is often draining to watch, extremely difficult to write up, and not very enlightening. The diagram chase typically produces a magical connection between distant parts of the diagram. It turns out that these long connections can be broken up into a number of short, unmagical maps via George Bergman's Salamander Lemma. The salamanders chase the diagram for you, so you just have to chase the salamanders. I will prove the Salamander Lemma, then use it to prove the Snake Lemma, the 3×3 Lemma, the Four Lemma, and the long exact sequence in homology.

I am the very model of a modern Major General,
I've information vegetable, animal, and mineral,
I know the kings of England, and I quote the fights historical
From Marathon to Waterloo, in order categorical;
I'm very well acquainted, too, with matters mathematical,
I understand equations, both the simple and quadratical,
About binomial theorem I'm teeming with a lot o' news,
With many cheerful facts about the square of the hypotenuse!

- Gilbert & Sullivan $P \circ P$