FROM THE PRINCIPAL

Sir Christopher Zeeman, FRS
Gresham Professor of Geometry

HERTFORD COLLEGE
OXFORD
OX1 3BW
Tel: 0865 - 279407/5

27.4.93

Dear Mitya,

That was a wonderful holiday that you gave Rosemary & me. We both feel tremendously rejuvenated, & miss your lovely house, as well as your birthday of course! I particularly miss the port & the wildlife. Thank you so much for making us so welcome.

I looked out my old paper on spectral sequences, & found it rather heavy going in retrospect! So I put the idea on a single sheet. The paper proves that representation is faithful. How I stumbled on this was that I invented this geometric representation to handle some complicated homology groups before I'd heard of spectral sequences & then translated the ideas to the latter when I ~~discovered~~ learnt about them. I still find it much the easiest way to envisage them.

Love from us both
yours ever
Christopher

GEOMETRIC REPRESENTATION OF SPECTRAL SEQUENCES.

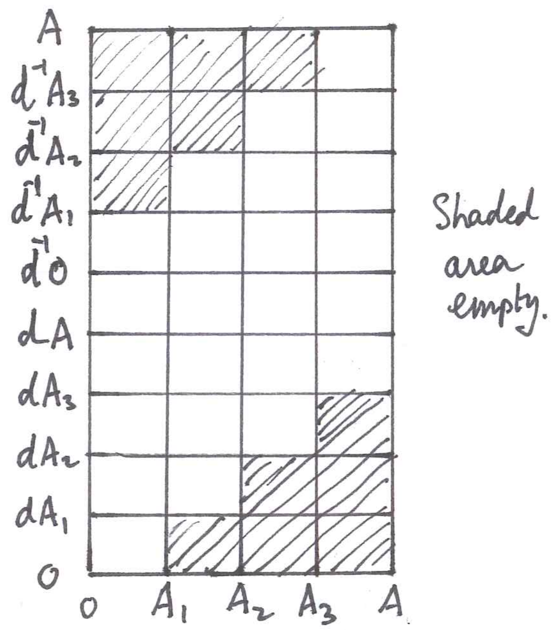
<u>Given</u> Filtered differential group.

i.e. groups $0 \subset A_1 \subset A_2 \subset A_3 \subset A_4 = A$

& homomorphism $d : A \to A$

such that $d^2 = 0$ and

$$dA_p \subset A_p.$$



<u>Represent</u> A_p by area to left of line A_p

dA_p, $d^{-1}A_p$ by areas below the lines so marked.

<u>Define</u> $E^0 = \sum_{p=1}^{4} E^0_p$, where $E^0_p = A_p / A_{p-1}$.

In other words E^0 is the graded group associated with the filtered group A.

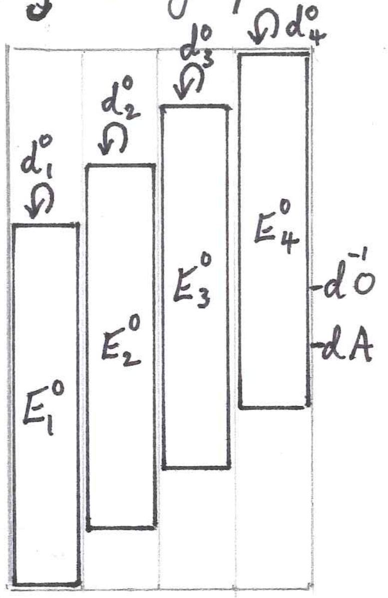
<u>Define inductively</u>

$$E^n = H(E^{n-1}, d^{n-1}),$$

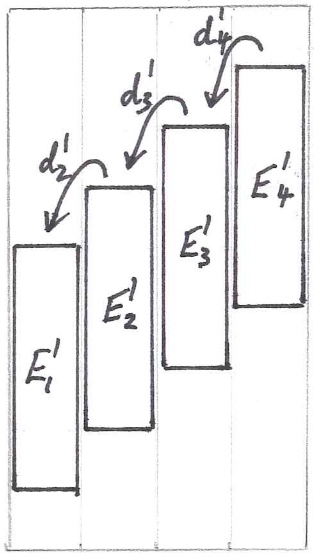
where d^{n-1} is induced by d.

<u>Deduce</u> ① $E^n = \sum_{p=1}^{4} E^n_p$

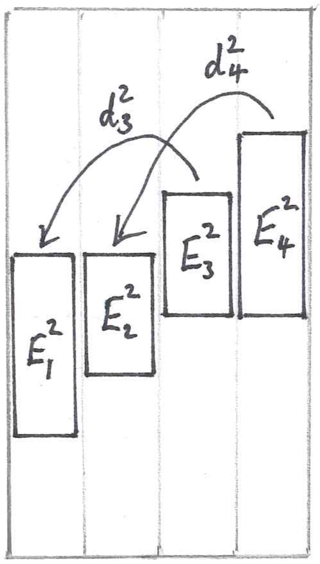
② $E^4 = E^\infty =$ the graded group assoc. with the filtered group $H(A)$.



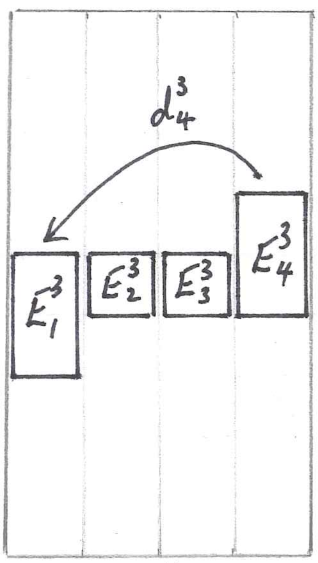
E^0



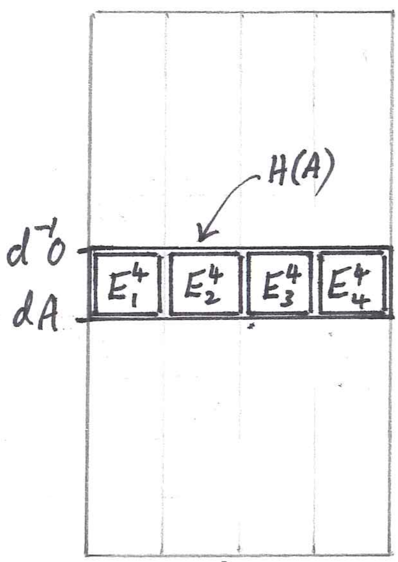
E^1



E^2



E^3



$E^4 = E^\infty$