$$d^2 = 0$$

$$\cdots \to C_{n+1} \xrightarrow{d_{n+1}} C_n \xrightarrow{d_n} C_{n-1} \to \cdots$$

$$H_n = \frac{\ker d_n}{\operatorname{im} d_{n+1}}$$

1. What I understand

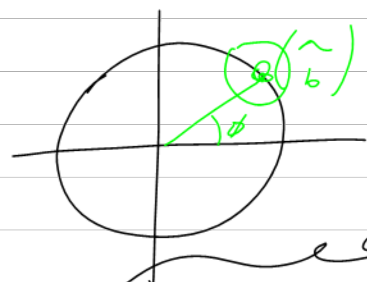
2. What I don't

detectable things

1. $H_n = \frac{\ker d_n}{\underbrace{\operatorname{im} d_{n+1}}_{\text{constructible things}}}$

How good are your constructions?

Example



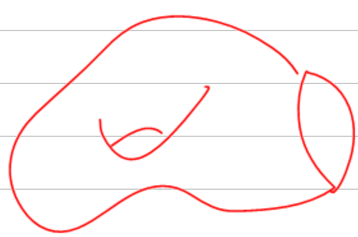
$d_1 \circ d_2$

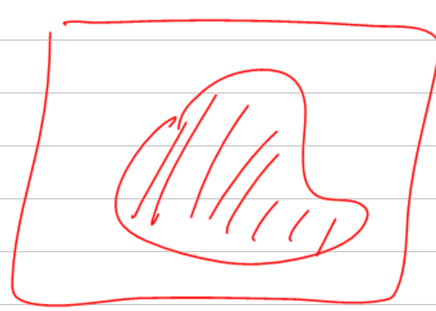
$d_2 // d_1 \quad = \cos^2 + \sin^2 - 1 = 0$

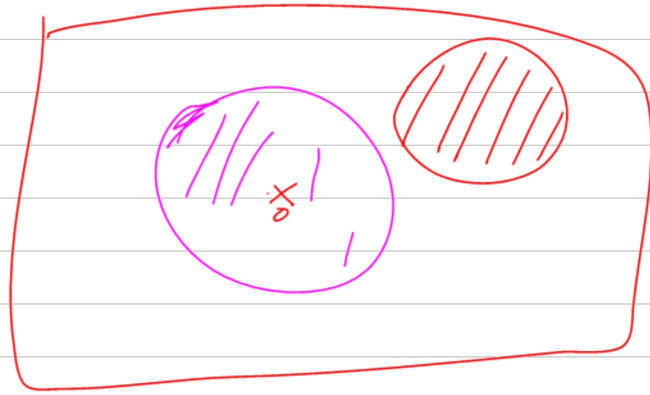
$\overbrace{\text{Sol's of } \quad x^2+y^2-1=0}^{d_1}$

image of $\theta \mapsto \begin{pmatrix} \cos\theta \\ \sin\theta \end{pmatrix}$ d_2

Exact







$$d(e) = e(x+y) - e(x)e(y) = 0$$

$$e(x) = \sum a_n x^n \quad a_0 = 1, \; a_1 = 1$$

David Kazhdan

$$C_k = \{\mathbb{R}^k \to \mathbb{R}\} \quad \mathbb{Q}[x_1, \ldots x_k]$$

$$C_1 \xrightarrow{f} C_2 \qquad (d_1 f)(x,y) = f(y) - f(x+y) + f(x)$$

$$C_2 \to C_3 \quad d_2(g)(x,y,z) = g(y,z) - g(x+y,z) + g(x,y+z) - g(x,y)$$

$$C_3 \to C_4 \quad (d_3 h)(w,x,y,z)$$

$$= h(x,y,z) - h(w+x,y,z) + h(w,x+y,z) - h(w,x,y+z) + h(w,x,y)$$

$$C_1 \to C_2 \to C_3 \to C_4 \ \cdots$$

C_1: linfunctions

C_2: $\exists$ exp

C_3: uniqueness of Associators

C_4: existence of Associators