

Feb 24

Goal: Given  $a, b, z, v$  where  $b \in \{0, 1, \dots, a-1\}$ , solve the system of 2 equations:

$$\begin{array}{c} \text{---} \\ \circlearrowleft U \quad \text{---} \quad \circlearrowright \\ \text{---} \end{array} = \begin{array}{c} \text{---} \\ \circlearrowleft a/b \\ \text{---} \end{array}$$

$$\begin{array}{c} \text{---} \\ \circlearrowleft U \quad \text{---} \quad \circlearrowright t/w \\ \text{---} \end{array} = \begin{array}{c} \text{---} \\ \circlearrowleft z/v \\ \text{---} \end{array}$$

Case I: Suppose  $U$  is rational.

Suppose  $U = j/p$ . Then

$$\frac{j}{p} = \frac{a}{b+Ka} \quad \text{and} \quad \frac{t}{w} = \frac{zx - a\tilde{v}}{b\tilde{v} - zy - kt}$$

or

$$\frac{j}{p} = \frac{a}{x+Ka} \quad \text{and} \quad \frac{t}{w} = \frac{zb - a\tilde{v}}{x\tilde{v} - zy - kt}$$

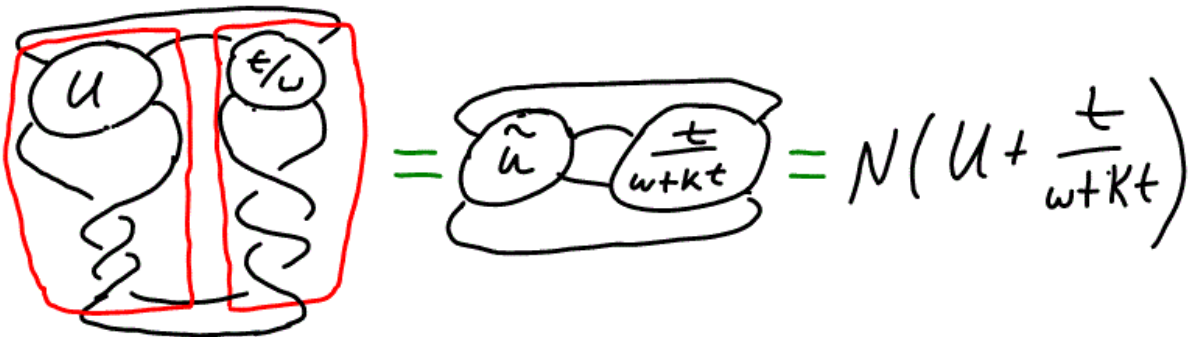
where  $\tilde{v} v^{\pm 1} = 1 \pmod{z}$

Observe



$$\text{Diagram 1} = \text{Diagram 2} = N\left(u + \frac{t}{w}\right)$$

||



$$\text{Diagram 3} = \text{Diagram 4} = N\left(u + \frac{t}{w+kt}\right)$$

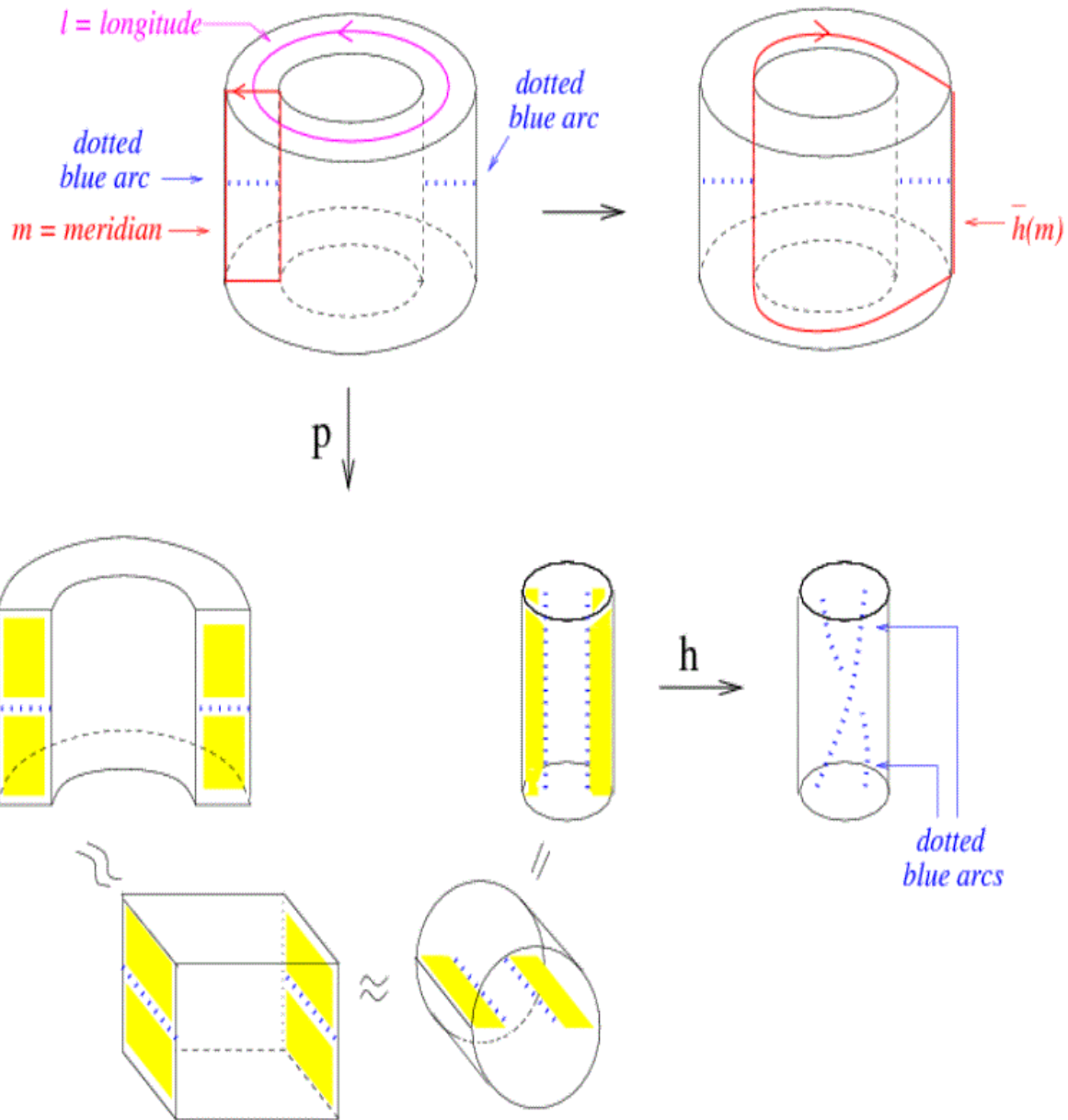
where  $\tilde{u} = \left. \begin{array}{c} u \\ \text{---} \\ \text{---} \\ \text{---} \end{array} \right\} -k$

and  $\left. \begin{array}{c} \frac{t}{w} \\ \text{---} \\ \text{---} \\ \text{---} \end{array} \right\} k = \frac{t}{w+kt} = 0 + \frac{1}{k + \frac{1}{\frac{t}{w}}}$

Hence  $N(u + \frac{0}{1}) = K_1$  ,  $N(u + \frac{t}{\omega}) = K_2$

has a sol'n iff the following also has a

$$N(\tilde{u} + \frac{0}{1}) = K_1 \quad , \quad N(\tilde{u} + \frac{t}{\omega + kt}) = K_2$$



Looking at  $M - V$  w/a focus on  $\partial(M - V) = \partial V$

