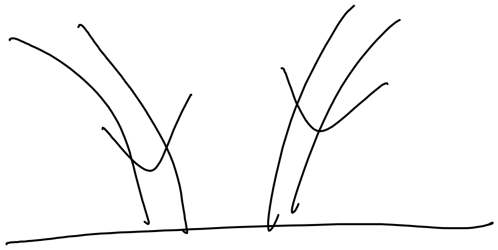
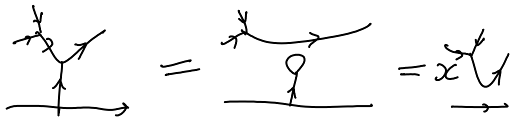
BCH Mod Shaft-Shave

August-04-09
8:59 AM

Problem - determine



mod shaft-shave -



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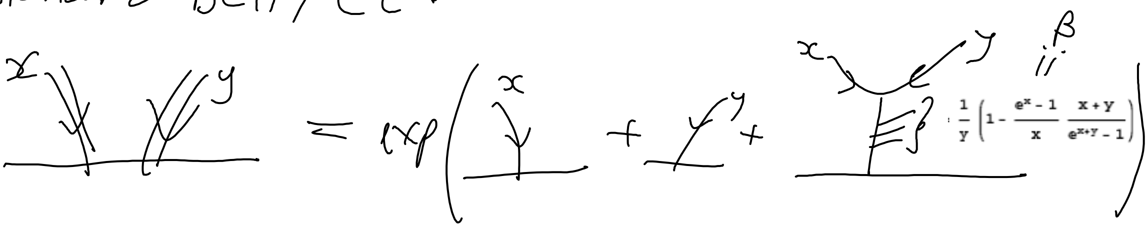
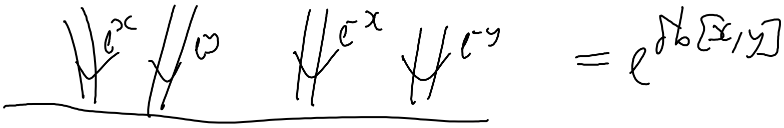
standard BCH / CC:



<u>Problem</u> Compute $e^x e^y e^{-x} e^{-y}$ mod shaft-shave, or even, mod CC.



Also, similarly compute $e^x e^y e^{-(x+y)} = e^{\gamma b[x,y]}$

note that $\gamma \neq \beta$ because $[x,y]$ does not commute with x and y.

Solution from Projects/ScatterAndGlow/BCH Formulas.nb:

$$\gamma = \frac{e^{-x-y}\left(e^{x+y}x + y - e^{x}(x+y)\right)}{x\,y\,(x+y)}$$

$$\delta = \frac{(-1+e^{x})(-1+e^{y})}{x\,y}$$

More on δ:

$$e^x e^y e^{-x} e^{-y} = e^{\delta b[x,y]} \Leftrightarrow e^x e^y = e^{\delta b[x,y]} e^y e^x$$

$$E(e^x e^y) e^{-y} e^{-x} = (x e^x e^y + e^x y e^y) e^{-y} e^{-x}$$

$$= x + \frac{1-e^{-x}}{x} b[x,y]$$

Glow

$= (e^{\delta b[x,y]} y\, x)\, e^{-x} e^{-y} e^{-\delta b[x,y]}$ ...

$\exists \left(e^{\delta b[x,y]} e^y e^x \right) e^{-x} e^{-y} e^{-\delta b[x,y]} = ($

$e^{-y} e^{-x} x e^x e^y = x + \frac{1-e^{-y}}{y} b[x,y]$

$e^{-x} e^{-y} e^{-\delta b[x,y]} \; x \; e^{\delta b[x,y]} e^y e^x$

$= e^{-x} e^{-y} \left(x + x \delta b[x,y] \right) e^y e^x$

$= e^{-x} \left[\frac{1-e^{-y}}{y} b[x,y] + x + x e^{-y} \delta b[x,y] \right] e^x$

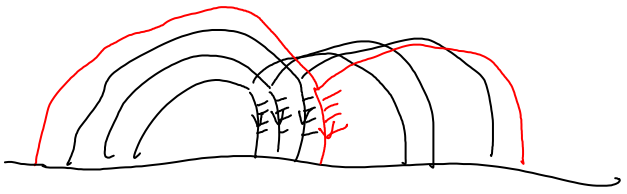
$\Rightarrow \quad \frac{1-e^{-y}}{y} = e^{-x} \left(\frac{1-e^{-y}}{y} + x e^{-y} \delta \right) \Rightarrow$

$\Rightarrow \quad x e^{-x} e^{-y} \delta = \frac{1-e^{-y}}{y} - e^{-x} \frac{1-e^{-y}}{y} = \frac{1-e^{-y}}{y} (1-e^{-x})$

$\Rightarrow \quad \delta = \frac{e^y - 1}{y} \frac{e^x - 1}{x}$ ✓

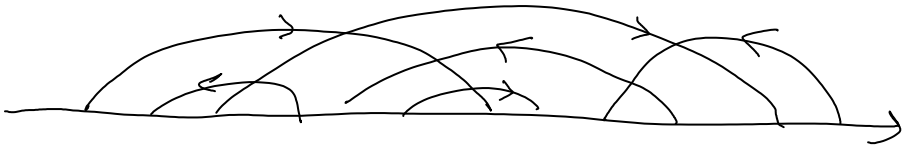
scathe

The glow of a Y.



[I wish I had a ModCC Toolbox ready.]

Suppose I had a global algorithm; how long will it run?



Every Y takes n to resolve; about n^2 Y's will need to be studied. Seems like n^3 total. (Though it also seems like less may be enough, for resolving the Y's seems easy).