$$\text{ɩ} \in \text{ null-hom}$$

$$\text{ʔ} \in {}^{\text{ħ}}\underset{m}{\triangle}\mathbb{C}$$

$$\text{ɿ} \in {}^{\text{ħ}}\underset{\omega}{\triangle}\mathbb{C}$$

$$\begin{cases} \bigwedge_{\text{h} \in \text{ħ}} \underset{-}{\deg}_{\text{h}} \text{ʔ} \in \mathbb{Z} \\ \bigwedge_{\text{h} \in \text{ɩ}^{=}} \underset{-}{\deg}_{\text{h}} \text{ʔ} = 0 \end{cases} \Rightarrow \begin{cases} \int_{dw/2\pi i}^{\text{ɩ}} \text{ɿ}\frac{\overset{-}{\text{ʔ}}}{\text{ʔ}} = \sum_{\text{h} \in \text{ɩ}^{<}} {}^{\text{h}}\text{ɿ} \underset{-}{\deg}_{\text{h}} \text{ʔ} \\ \int_{dw/2\pi i}^{\text{ɩ}} \frac{\overset{-}{\text{ʔ}}}{\text{ʔ}} = \sum_{\text{h} \in \text{ɩ}^{<}} \underset{-}{\deg}_{\text{h}} \text{ʔ} = \underset{-}{\deg}_{\text{ɩ}^{<}} \text{ʔ} \end{cases}$$

$$A = \begin{Bmatrix} \text{h} \in \text{ħ} \\ \underset{-}{\deg}_{\text{h}} \text{ʔ} \neq 0 \end{Bmatrix} \subset \text{ħ} \llcorner \text{ɩ}^{\leqslant}$$

$$g = \text{ɿ}\frac{\overset{-}{\text{ʔ}}}{\text{ʔ}} \in {}^{\text{ħ}}\underset{m}{\triangle}\mathbb{C} \cap {}^{\text{ħ}\llcorner A}\underset{\omega}{\triangle}\mathbb{C}$$

$$\text{h} \in A \Rightarrow {}^{\text{h}}\mathrm{Res}\, g dz = {}^{\text{h}}\text{ɿ}\, {}^{\text{h}}\mathrm{Res} \frac{d\text{ʔ}}{\text{ʔ}} = {}^{\text{h}}\text{ɿ}\, \underset{-}{\deg}_{\text{h}} \text{ʔ}$$

$$\text{ħ} \supset K = \text{ɩ}^{<} \cup \text{ɩ}^{=} \text{ cpt}$$

$$K \cap A \text{ finit } \Rightarrow \underset{-}{\deg}_{K} \text{ʔ} \in \mathbb{Z}$$

$$\text{ħ} \supset K \text{ cpt}$$

$$\partial K \text{ stw-glatt}$$

$$\text{ʔ} \in {}^{\text{ħ}}\underset{m}{\triangle}\mathbb{C}$$

$$\begin{cases} \bigwedge_{\text{h} \in \text{ħ}} \underset{-}{\deg}_{\text{h}} \text{ʔ} \in \mathbb{Z} \\ \bigwedge_{\text{h} \in \text{ɩ}^{=}} \underset{-}{\deg}_{\text{h}} \text{ʔ} = 0 \end{cases} \Rightarrow \int_{dw/2\pi i}^{\partial K} \frac{\overset{-}{\text{ʔ}}}{\text{ʔ}} = \underset{-}{\deg}_{K} \text{ʔ}$$

$$\mathbb{C} \supset ħ \supset K \text{ comp}$$

$$\partial K \text{ stw-glatt}$$

$$\dot{ɿ} \in {}^{ħ}\triangle_{\omega}\mathbb{C}$$

$$\ulcorner ɿ - ɿ́ \urcorner < \ulcorner ɿ \urcorner + \ulcorner ɿ́ \urcorner \text{ on } \partial K \underset{\text{Rouche}}{\Longrightarrow} \underset{-K}{\deg} ɿ = \underset{-K}{\deg} ɿ́$$

$$ɿ_t = tɿ + (1-t)\, ɿ́ \in {}^{ħ}\triangle_{\omega}\mathbb{C}$$

$$\bigwedge_{w \in \partial K} {}^{w}ɿ_t \neq 0$$

$$\lightning \bigvee_{w}^{\partial K} {}^{w}ɿ_t = 0 \Rightarrow t\,{}^{w}ɿ = (t-1)\,{}^{w}ɿ́ \Rightarrow$$

$$\ulcorner {}^{w}ɿ - {}^{w}ɿ́ \urcorner = \ulcorner t\underbrace{{}^{w}ɿ́ - {}^{w}ɿ} \urcorner + \ulcorner (1-t)\underbrace{{}^{w}ɿ - {}^{w}ɿ́} \urcorner = \ulcorner t\,{}^{w}ɿ́ + (1-t)\,{}^{w}ɿ́ \urcorner + \ulcorner (1-t)\,{}^{w}ɿ + t\,{}^{w}ɿ \urcorner = \ulcorner {}^{w}ɿ́ \urcorner + \ulcorner {}^{w}ɿ \urcorner \lightning$$

$$\mathbb{Z} \ni \underset{-K}{\deg} ɿ_t = \int_{dw/2\pi i}^{\partial K} \frac{\underline{ɿ}_t}{ɿ_t} \text{ stet in t } \Longrightarrow \text{ const}$$

$${}^{z}ɿ = z^4 - 4z + 2$$

$${}^{z}ɿ_1 = 2 - 4z$$

$${}^{1/2}ɿ_1 = 1$$

$$\ulcorner {}^{z}ɿ - {}^{z}ɿ_1 \urcorner = \ulcorner z^4 \urcorner = 1$$

$$\ulcorner {}^{z}ɿ_1 \urcorner = \ulcorner 2 - 4z \urcorner \geqslant \ulcorner 4z \urcorner - 2 = 2$$

$$\underset{B}{\sharp} ɿ = \underset{\Downarrow}{\sharp} s = 1$$

$$\sharp \frac{\ulcorner z \urcorner < 1}{e^{z-1} = az} = 1$$

$$a > 1$$

$$a = 1$$

$$\ulcorner \underbrace{e^{z-1} - az} + az \urcorner = e^{x-1} \leqslant 1 < \ulcorner az \urcorner \text{ on } \partial\mathbb{B}$$

$$ʕ \in {}^{B}\triangle_{\omega}\mathbb{C} \cap {}^{\bar{B}}\triangle_{0}\mathbb{C}$$

$$\ulcorner ʕ \urcorner < 1 \text{ on } \partial\mathbb{B} \Longrightarrow \sharp \frac{\ulcorner z \urcorner < 1}{{}_{z} ʕ = z^n} = n$$

$$\ulcorner \underbrace{{}^{z} ʕ - z^n} + z^n \urcorner < 1 \leqslant \ulcorner z^n \urcorner \text{ on } \partial\mathbb{B} \Longrightarrow \underset{-}{\deg}_B \left(ʕ - z^n\right) = \underset{-}{\deg}_B z^n = n$$

$$z^5 + 15z + 1$$

$$\begin{cases} 5 \text{ roots in} & \ulcorner z \urcorner < 2 \\ 1 \text{ root in} & \ulcorner z \urcorner < 3/2 \end{cases}$$

$$z^5 + 4z - 1$$

$$\sharp \text{ zeros in } \begin{cases} \ulcorner z \urcorner < 1 \\ \ulcorner z \urcorner < 2 \end{cases}$$

$$0 = 3\,z^4 - 7z + 2{:}1 < \ulcorner z \urcorner < 3/2$$