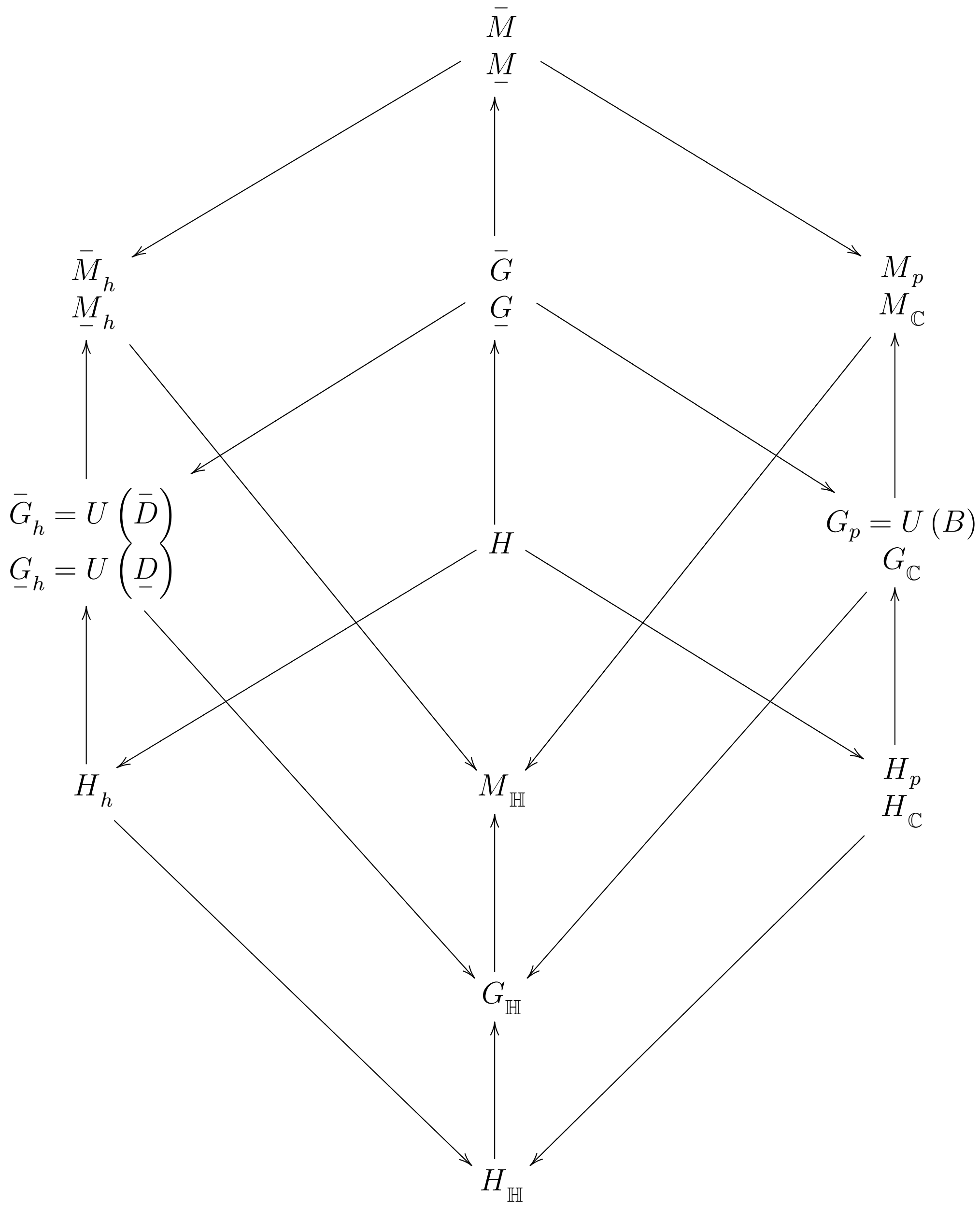
$$G/H = \frac{q \in G}{jq\overset{*}{j} = q^{-1}}$$

$$G \ni g \Longrightarrow \overset{*}{g}\, j g = j$$

$$U \ni g \Longrightarrow \overset{*}{g}\, g = 1$$

$$j_{z} = 1 + 2\overset{*}{j}\, z^{j} = \overbrace{j - z}^{-1} \underbrace{j + z} = j_{-z}^{-1}$$

$$\overset{*}{j}\, z = -z \overset{*}{j} \Longrightarrow \begin{cases} j j_{z} \overset{*}{j} = j_{-z} \\ j_{z}^{*} = \overset{*}{j}_{-z^{*}} \end{cases}$$


$\bar{M}$
$\underline{M}$
$\bar{M}_h$
$\underline{M}_h$
$\bar{G}$
$\underline{G}$
M_p
$M_{\mathbb{C}}$
$\bar{G}_h = U\left(\bar{D}\right)$
$\underline{G}_h = U\left(\underline{D}\right)$
H
$G_p = U\left(B\right)$
$G_{\mathbb{C}}$
H_h
$M_{\mathbb{H}}$
H_p
$H_{\mathbb{C}}$
$G_{\mathbb{H}}$
$H_{\mathbb{H}}$

$$j\underbrace{j+z}_{-1}j+\underbrace{\overset{-1}{j}+\overset{-1}{z}}_{-1}=j$$

$$\overset{-1}{j}+\overset{-1}{z}=\overset{-1}{j}+\overset{-1}{z}j\overset{-1}{j}=\overset{-1}{z}j\overset{-1}{j}+\overset{-1}{j}=\overset{-1}{z}\underbrace{j+z}\overset{-1}{j}$$

$$\Rightarrow\underbrace{\overset{-1}{j}+\overset{-1}{z}}_{-1}=j\underbrace{j+z}_{-1}z=j\underbrace{j+z}_{-1}\underbrace{j+z-j}=j-j\underbrace{j+z}_{-1}j$$

$${}^{z}\mathfrak{c}=j\underbrace{j+z}_{-1}\underbrace{j-z}=2j\underbrace{j+z}_{-1}j-j=2j\widetilde{j}^{-z}j-j$$

$$j\underbrace{j+z}_{-1}\underbrace{j-z}=-j\underbrace{j+z}_{-1}\underbrace{z-j}=-j\underbrace{j+z}_{-1}\underbrace{z+j-2j}=-j+2j\underbrace{j+z}_{-1}j$$

$$\widetilde{j}^{-z}=\underbrace{1+\widetilde{j}z}_{-1}\widetilde{j}=\underbrace{\widetilde{j}j+\widetilde{j}z}_{-1}\widetilde{j}=\underbrace{\widetilde{j}\overbrace{j+z}}_{-1}\widetilde{j}=\underbrace{j+z}_{-1}\Rightarrow j\widetilde{j}^{-z}j=j\underbrace{j+z}_{-1}j$$

$$\overset{-1}{\mathfrak{c}}=\mathfrak{c}$$

$${}^{z\mathfrak{c}}\mathfrak{c}+j=2j\underbrace{j+{}^{z}\mathfrak{c}}_{-1}j=2j\overbrace{2j\underbrace{j+z}_{-1}j}^{-1}j=\underbrace{j\overbrace{j+z}^{-1}}_{-1}j=j+z$$

$${}^{w}\overset{-1}{\mathfrak{c}}=\underbrace{j-w}_{-1}\underbrace{j+w}\overset{-1}{j}=2\underbrace{j-w}_{-1}-\overset{-1}{j}$$

$$\underbrace{j-w}_{-1}\underbrace{j+w}\overset{-1}{j}=-\underbrace{w-j}_{-1}\underbrace{w+j}\overset{-1}{j}=-\underbrace{w-j}_{-1}\underbrace{w-j+2j}\overset{-1}{j}=-\overset{-1}{j}-2\underbrace{w-j}_{-1}=2\underbrace{j-w}_{-1}-\overset{-1}{j}$$

$$\begin{cases}\overbrace{z+w}^{\sim}=\widetilde{z}+\widetilde{w}\\ \widetilde{z}^{-1}=\overset{-1}{z}{}^{\sim}\\ \overbrace{xyx}^{\sim}=\widetilde{x}\widetilde{y}\widetilde{x}\end{cases}$$

$$\widetilde{z}\, z = 1 = \widetilde{j}\, j \Longrightarrow {}^{z}\widetilde{\mathfrak{c}}\, j = -\widetilde{j}\; {}^{z}\mathfrak{c}$$

$${}^{z}\mathfrak{c} = 2j \underbrace{j+z}_{-1} j - j = 2\overbrace{j \underbrace{j+z}_{-1} j - j} + j = j - 2\underbrace{\overset{-1}{j} + \overset{-1}{z}}_{-1} = j - 2\underbrace{\widetilde{j} + \widetilde{z}}_{-1}$$

$$\Longrightarrow {}^{z}\widetilde{\mathfrak{c}} = \widetilde{j} - 2\underbrace{j+z}_{-1} \Longrightarrow {}^{z}\widetilde{\mathfrak{c}}\, j = \widetilde{j}\, j - 2\underbrace{j+z}_{-1} j = 1 - 2\underbrace{j+z}_{-1} j$$

$$\widetilde{j}\; {}^{z}\mathfrak{c} = 2\widetilde{j}\, j \underbrace{j+z}_{-1} j - \widetilde{j}\, j = 2\underbrace{j+z}_{-1} j - 1$$

$$\widetilde{w}\, j = -\widetilde{j}\, w \Longrightarrow {}^{w}\widetilde{\mathfrak{c}} = {}^{w}\overset{-1}{\mathfrak{c}}$$

$$\underbrace{\widetilde{j} + \widetilde{w}} j = 1 + \widetilde{w}\, j = 1 - \widetilde{j}\, w = \widetilde{j}\, \underbrace{j - w} \Longrightarrow \underbrace{j - w} = j \underbrace{\widetilde{j} + \widetilde{w}} j \Longrightarrow \underbrace{j - w}_{-1} = \widetilde{j}\, \underbrace{\widetilde{j} + \widetilde{w}}_{-1} \widetilde{j}$$

$$\Longrightarrow {}^{w}\widetilde{\mathfrak{c}} = \overbrace{2j \underbrace{j+w}_{-1} j - j}^{\sim} = 2\widetilde{j}\, \underbrace{\widetilde{j} + \widetilde{w}}_{-1} \widetilde{j} - \widetilde{j} = 2\underbrace{j - w}_{-1} - \widetilde{j} = {}^{w}\overset{-1}{\mathfrak{c}}$$

$$\widetilde{w}\, j = \widetilde{j}\, w \Longrightarrow j\, {}^{w}\widetilde{\mathfrak{c}} = {}^{w}\mathfrak{c}\, \widetilde{j}$$

$$j \underbrace{\widetilde{j} + \widetilde{w}} = 1 + j\, \widetilde{w} = 1 + w\, \widetilde{j} = \underbrace{j + w}\, \widetilde{j} \Longrightarrow j \underbrace{j + w}_{-1} = \underbrace{\widetilde{j} + \widetilde{w}}_{-1} \widetilde{j}$$

$$\Longrightarrow {}^{w}\mathfrak{c}\, \widetilde{j} = 2j \underbrace{j + w}_{-1} - 1 = 2\underbrace{\widetilde{j} + \widetilde{w}}_{-1} \widetilde{j} - 1 = j\, {}^{w}\widetilde{\mathfrak{c}}$$

$$\begin{array}{ccc} {}^{n}\mathbb{K}_{n} & \xrightarrow{\quad\mathfrak{c}\quad} & {}^{n}\mathbb{K}_{n} \\ \cup & & \cup \\ {}^{n}\mathbb{K}_{n}^{\text{Ʊ}} & \xrightarrow{\quad\mathfrak{c}\quad} & {}^{n}\mathbb{K}_{n}^{\mathsf{U}} \end{array}$$

$${}^{n}\mathbb{K}_{n}^{\mathbb{C}} \ni z$$

$$j = 1$$

$$\widetilde{z} = \overset{*}{z}$$

$$^{z}\mathfrak{c} = \underbrace{1+z}_{-1}\underbrace{1-z}$$

$$\overset{*}{w} = -w \Leftrightarrow {}^{\overset{*}{w}}\mathfrak{c}\;{}^{w}\mathfrak{c} = 1$$

$$V = {}^{n}\mathbb{K}_{n}^{\mathbb{C}} = \begin{cases} {}^{n}\mathbb{R}_{n}^{\mathbb{C}} \\ {}^{n}\mathbb{C}_{n}^{\mathbb{C}} \\ {}^{n}\mathbb{H}_{n}^{\mathbb{C}} \end{cases}$$

$$\overset{\beta}{\daleth} = \overset{*}{\daleth}$$

$$e \in V^{\beta} = {}^{n}\mathbb{K}_{n}^{\mathbb{U}} = \begin{cases} {}^{n}\mathbb{R}_{n}^{\mathbb{U}} \\ {}^{n}\mathbb{C}_{n}^{\mathbb{U}} \\ {}^{n}\mathbb{H}_{n}^{\mathbb{U}} \end{cases}$$

$$V_{\beta} = {}^{n}\mathbb{K}_{n}^{\Theta} = \begin{cases} {}^{n}\mathbb{R}_{n}^{\Theta} \\ {}^{n}\mathbb{C}_{n}^{\Theta} \\ {}^{n}\mathbb{H}_{n}^{\Theta} \end{cases}$$

$$M = {}^{n}\mathbb{K}_{n}^{\mathrm{U}} = \begin{cases} {}^{n}\mathbb{R}_{n}^{\mathrm{U}} \\ {}^{n}\mathbb{C}_{n}^{\mathrm{U}} \\ {}^{n}\mathbb{H}_{n}^{\mathrm{U}} \end{cases} \quad \text{group case}$$

$$\begin{array}{ccc} {}^{n}\mathbb{K}_{n}^{\mathbb{C}} & \xrightarrow{\mathfrak{c}} & {}^{n}\mathbb{K}_{n}^{\mathbb{C}} \\ \uparrow & & \uparrow \\ {}^{n}\mathbb{K}_{n}^{\Theta} & \xrightarrow{\mathfrak{c}} & {}^{n}\mathbb{K}_{n}^{\mathrm{U}} \end{array}$$

$$^{z}\mathfrak{c} = e^{z}\,\overset{*}{e}\,\underbrace{e-z} = \underbrace{1-e\overset{*}{z}}_{-1}\,e\,\overset{*}{e}\,\underbrace{e-z} = \underbrace{e-\overset{*}{z}}_{-1}\underbrace{e-z}$$

$$\overset{*}{y} = -y \Longrightarrow {}^{y}\mathfrak{c} = \underbrace{e+y}_{-1}\underbrace{e-y}$$

$$1 - {}^{z}\mathfrak{c}\,{}^{w}\mathfrak{c}^{*} = 2\,\underbrace{e+z}_{-1}\,\underbrace{z-w}\,\underbrace{e-w}_{-1}$$

$$^{1-{}^{z}\mathfrak{c}\,{}^{w}\mathfrak{c}^{*}}\Delta = 2^{r}\,{}^{e+z}\Delta^{-1}\,{}^{z-w}\Delta\,{}^{e-w}\Delta^{-1}$$

$$\underbrace{1 - \underbrace{e+z}_{-1}\underbrace{e-z}\overbrace{\underbrace{e+w}_{-1}\underbrace{e-w}}^{*}} = \overbrace{1 - \underbrace{e+z}_{-1}\underbrace{e-z}\underbrace{e+w}\underbrace{e-w}_{-1}}$$

$$= \underbrace{e+z}_{-1}\,\overbrace{\underbrace{e+z}\underbrace{e-w} - \underbrace{e-z}\underbrace{e+w}}\,\underbrace{e-w}_{-1} = 2\,\underbrace{e+z}_{-1}\,\underbrace{z-w}\,\underbrace{e-w}_{-1}$$