

COMMUTATIVE DIAGRAM

$$\begin{array}{ccccccc}
 \cdots & \longrightarrow & \mathrm{Hom}(\Gamma, P)_\sigma & \xrightarrow{z} & Z^1(\Gamma, V)_\sigma & \xrightarrow{Z^1(\iota)} & Z^1(\Gamma', V)_{\sigma^\iota} \xleftarrow{z^\iota} \mathrm{Hom}(\Gamma', P)_{\sigma^\iota} \longleftarrow \cdots \\
 & & \downarrow \phi & & \downarrow \psi & & \downarrow \psi^\iota & & \downarrow \phi^\iota \\
 \cdots & \longrightarrow & \mathrm{Hom}(\Gamma, P)_\sigma/V & \xrightarrow{h} & H^1(\Gamma, V)_\sigma & \xrightarrow{H^1(\iota)} & H^1(\Gamma', V)_{\sigma^\iota} \xleftarrow{h^\iota} \mathrm{Hom}(\Gamma', P)_{\sigma^\iota}/V \longleftarrow \cdots \\
 & & \downarrow \tilde{\phi} & & \downarrow \tilde{\psi} & & \downarrow \widetilde{\psi}^\iota & & \downarrow \tilde{\phi}^\iota \\
 \cdots & \longrightarrow & \mathrm{Hom}(\Gamma, P)_\sigma/VC_L(\sigma) & \xrightarrow{\tilde{h}} & H^1(\Gamma, V)_\sigma/C_L(\sigma) & \xrightarrow{\widetilde{H^1(\iota)}} & H^1(\Gamma', V)_{\sigma^\iota}/C_L(\sigma) \xleftarrow{\tilde{h}^\iota} \mathrm{Hom}(\Gamma', P)_{\sigma^\iota}/VC_L(\sigma) \longleftarrow \cdots
 \end{array}$$