

HOMWORK 1

1. Consider the complex of abelian groups:

$$0 \rightarrow V \xrightarrow{\delta^{-1}} C^0(\Gamma, V) \xrightarrow{\delta^0} C^1(\Gamma, V) \xrightarrow{\delta^1} \cdots C^n(\Gamma, V) \xrightarrow{\delta^n}$$

Prove the following claims for any $n \geq -1$:

- (a) $\delta^{n+1} \circ \delta^n = 0$.
- (b) The complex is exact, i.e. $\text{im}(\delta^n) = \ker(\delta^{n+1})$.

2. Prove that $H^0(\Gamma, V) \cong V^\Gamma$ for any $R\Gamma$ -module V .