

Representation of Quivers

Chanelle Lee

Student ID: 200646370

Supervisor: William Crawley-Boevey

November 15, 2014

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Chapter 1

Introduction

Chapter 2

Homological Algebra

2.1 Chain Complexes

Definition 2.1.1. A *chain complex* C consists of a sequence of \mathbb{R} -modules C_i and homomorphisms of the form,

$$\dots \xrightarrow{\delta_2} C_1 \xrightarrow{\delta_1} C_0 \xrightarrow{\delta_0} C_{-1} \xrightarrow{\delta_{-1}} C_{-2} \rightarrow \dots$$

such that $\delta_{n-1}\delta_n = 0$ for all n , i.e. the composition of any two consecutive maps is zero. The maps δ_n are called the *differentials* of C .

Remark 2.1.2. It is convention that the map δ_n starts at C_n .

Definition 2.1.3. If C is a chain complex then its *homology* is defined to be,

$$H_n(C) = \frac{\text{Ker}(\delta_n : C_n \rightarrow C_{n-1})}{\text{Im}(\delta_{n+1} : C_{n+1} \rightarrow C_n)} = \frac{Z_n(C)}{B_n(C)}.$$