Sheet 4

Question 4.1

Formulate the dual version of Lemma 3.18 for right homotopies!

Question 4.2

Find a path object for an arbitrary cochain complex $M \in \mathsf{dgMod}_R$.
Find a cylinder object for M.

Question 4.3

Let $f : A \to X$ be a weak equivalence between fibrant cofibrant objects. Show that it is a homotopy equivalence.

Hint: Use Ken Brown's Lemma.

Question 4.4

In Example 3.6 and Remark 3.7 we have defined two model structures on dgMod_R, the injective and the projective one. Show that the identity functor defines a Quillen adjunction beween the two model structures.