MA 665 EXERCISES 6

(1) Let f be a morphism of chain complexes. Show that if $\ker(f)$ and $\operatorname{coker}(f)$ are acyclic, then f is a quasi-isomorphism. Is the converse true?

(2) Show that $L_0 F(f) = F(f)$ under the identification $L_0 F(A) \cong F(A)$.

(3) Consider the homology $H_*(C)$ of a chain complex C as a chain complex with zero differentials. Show that if the complex C is split, then there is a chain homotopy equivalence between C and $H_*(C)$. Give an example where the converse fails.