

# MATH 74, SPRING 2005

## TOPOLOGY II: INTRODUCTION TO ALGEBRAIC TOPOLOGY

HOMEWORK FOR MONDAY, APRIL 4: ADDITIONAL EXERCISES

DUE DATE: Friday, April 8 at the end of the lecture

**Exercise 2.** Let  $u : I \rightarrow Y$  be a path and  $\varphi : I \rightarrow I$  be a continuous map such that  $\varphi(0) = 0$  and  $\varphi(1) = 1$ . Prove that  $[u] = [u \circ \varphi]$ .

**Exercise 3.** Let  $f : S^n \rightarrow Y$  be a continuous map. Prove that  $f$  is homotopic to a constant map **iff** there is a continuous extension of  $f$  to the  $(n+1)$ -dimensional ball. That is, there exists a continuous map  $\bar{f} : D^{n+1} \rightarrow Y$  such that  $\bar{f}|_{S^n} = f$ .