page 40, line -3

$f: X \to Y$ continuous $\Rightarrow$ the maps

$f_\#: S_n(X) \to S_n(Y)$, sending singular

n-simplices $T: \Delta_n \to X$ to the composites

$f \circ T: \Delta_n \to Y$, are chain maps.

Details Need only check $d f_\# = f_\# d$ on a singular simplex since these generate. But

$$d f_\# T = \sum (-1)^i (f \circ T) | \partial_i \Delta_n \overset{\text{associativity}}{\underset{\text{of composition}}{=\!=}}$$

$$\sum (-1)^i f \circ (T | \partial_i \Delta_n) = f_\# \left(\sum (-1)^i (T | \partial_i \Delta_n) \right) =$$

$$f_\# d T \ \blacksquare$$

page 47, lines −9 to −8

Proof that $\beta_q - 1_q - \sum_j (-1)^j \partial_{j\#} L_q$ is a cycle.

Details: By the formula at the top of p. 47 we have $d\beta_q = \sum' (-1)^k \partial_{k\#} \beta_{q-1}$, so

$$d(\beta_q - 1_q) = \sum_k{}' (-1)^k \partial_{k\#} (\beta_{q-1} - 1_{q-1})$$

and by the induction hypothesis this equals

$$\sum_k{}' (-1)^k \partial_{k\#} \left(L_q + \sum' (-1)^j \partial_{j\#} L_{q-1} \right) =$$

$$\sum_k{}' (-1)^k \partial_{k\#} L_q + \sum_{k,j}{}' (-1)^{j+k} \partial_{k\#} \partial_{j\#} L_{q-1}$$

This is zero by the usual identity $\sum' (-1)^{j+k} \partial_{k\#} \partial_{j\#} = 0$

Therefore d_q sends

(Left Hand Side) − (Right Hand Side) to zero,

which is what we wanted to prove.

page 48, line ~~??~~ 20

If $\beta : S_*(X) \longrightarrow S_*(X)$ is barycentric subdivision and $L : \beta \simeq 1$ is a chain homotopy, then $(1 + \dots + \beta^{r-1}) \circ L$ is a chain homotopy $\beta^r \simeq 1$.

Details

$$d(1+\dots+\beta^{r-1})L + (1+\dots+\beta^{r-1})Ld \overset{\text{each } \beta^j \text{ is a}}{\underset{\text{chain map}}{=}}$$

$$\big((1+\dots+\beta^{r-1})\circ dL\big) + \big((1+\dots+\beta^{r-1})\circ Ld\big) =$$

$$(1+\dots+\beta^{r-1})\circ(\beta - 1) = \beta^r - 1. \blacksquare$$