That is, for any fixed $\epsilon > 0$, there exist P and f such that

$$\mathrm{M}(P - f_\# T) + \mathrm{M}(\partial P - \partial f_\# T) \le \epsilon \tag{3.12a}$$

$$\mathrm{Lip}(f) \le 1 + \epsilon \tag{3.12b}$$

$$\mathrm{Lip}(f^{-1}) \le 1 + \epsilon \tag{3.12c}$$

From Equations (3.12a) to (3.12c), we obtain mass bounds on P and ∂P:

$$\mathrm{M}(P) \le \mathrm{M}(f_\# T) + \epsilon \tag{3.13a}$$

$$\le (1+\epsilon)^m \, \mathrm{M}(T) + \epsilon \tag{3.13b}$$

$$\mathrm{M}(\partial P) \le \mathrm{M}(\partial f_\# T) + \epsilon \tag{3.13c}$$

$$\le (1+\epsilon)^{m-1} \, \mathrm{M}(\partial T) + \epsilon \tag{3.13d}$$

The bounds in Equations (3.10b) and (3.10c) follow by choosing ϵ small enough. □

3.3 Results

The simplicial deformation theorem can be modified to allow multiple currents to be deformed simultaneously by projecting from the same centers. As opposed to using Theorem 3.2.4 separately on each current (where the centers of projection need not be the same), this yields a linearity result: deformations of linear combinations are linear combinations of deformations. Pushing multiple currents at the same time comes at the cost of looser bounds on the deformation (linear in the number of currents) although slightly tighter analysis allows the bounds to be reduced by approximately a factor of 2 (Corollary 3.3.2).

Theorem 3.3.1. *Suppose $\epsilon > 0$ and we have the hypotheses of Theorem 3.2.4 except*