10.12 Since $V_{in1} = V_{in2}$, we have equal current sharing.

$$I_{C1} = \frac{(I_{EE} + \Delta I)}{2}$$

$$I_{C2} = \frac{(I_{EE} + \Delta I)}{2}.$$

$$\therefore V_{out1} = V_{CC} - I_{C1}R_C = V_{CC} - \frac{(I_{EE} + \Delta I)R_C}{2}$$

$$V_{out2} = V_{CC} - I_{C2}R_C = V_{CC} - \frac{(I_{EE} + \Delta I)R_C}{2}.$$

$$\therefore \Delta V_{out1} = V_{out1} - V_{out1}\big|_{\Delta I = 0} = -\frac{\Delta I R_C}{2}.$$

$$\Delta V_{out2} = -\frac{\Delta I R_C}{2}.$$

However $V_{out} = V_{out1} - V_{out2} = 0.$

$$\therefore \Delta V_{out} = 0$$ (No change in output when I_{EE} changes).

Could also have used the large signal result from lectures, $V_{out} = -R_C I_{EE} \tanh\left(\frac{V_{in1} - V_{in2}}{V_T}\right)$ and subst. $V_{in1} = V_{in2}$ to obtain $V_{out} = 0$ $\therefore$ Indep. of I_{EE}.