Slop Compensation for Grid tied Battery Boost Converter using slva110.pdf from ti.

Note that the slope of the downward inductor current is used (scaled by 0.5 - 0.75) even though the control circuit only see's the rising inductor current. It doesn't mattr if the circuit is a buck or boost it is the downward inductor slop we are interested in.

Step 1 Caculate down Slope of boost worst case

$$S(L) = \frac{V_{in(min)} - V_{out}}{L_{(min)}}$$

tolerance
$L = 94\mu H \times 0.8 = 75\mu H$
$V_{in} = 28\text{cells} \times 3.2 = 89.6$
$V_{out} = 160V$

$$\frac{89.6 - 160}{75\mu H} = -0.939\ A/\mu Sec$$

Step 2 1V/A

Step 3 Calculate equivalent down Sloe Ramp

$VS(L)' = S(L)' \cdot R_{sense}$

Now I have a difference opamp with gain $\frac{10000}{330} = 30.\overline{30}$

(Note the problem I see with this step is: the control never see's the down slope through Rsense. But let's go with it.)

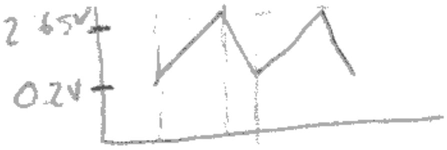
$R_{sense} = 0.002$ Ohms

$0.939 \times 0.002 \times 30.\overline{30}$
$= 0.056\overline{90}\ V/\mu Sec$

Step 4 Caculate the Oscillator charge slope

$$VS_{(osc)} = \frac{d(V_{(osc)})}{T_{on}}$$ Now for the UCC2800

$d(V_{(osc)}) = 2.45\ V$



Rise time = $R_T C_T$
fall time is $130 \cdot C_T$
$R_T = 30k$ $C_T = 200pF$
Rise time = $6\mu Sec$
fall time = $0.026\mu Sec$

$\therefore VS_{(osc)} = \frac{2.45}{6\mu Sec} = 0.408\overline{3}\ V/\mu Sec$

or $\frac{1.5}{200p \cdot 30k} = 250KHz = 4\mu Sec$

$\frac{2.45}{4\mu Sec} = 0.6125\ V/\mu Sec$

Step 5 Generate Ramp Equations

$R_1 = 1K$ $M = 0.75$

$$R_2 = \frac{R_1 \cdot VS_{(osc)}}{VS(L)' \cdot M}$$

$$\therefore R_2 = \frac{1K \times 0.408\overline{3}}{0.056\overline{90} \times 0.75} = 9.56\ K\ ohms$$

or

$$\frac{1K \times 0.6125}{(0.056\overline{90} \times 0.75)} = 14.3K\ ohms$$