Tellegen’s Theorem

For any valid circuit (all $R$, $L$, $C$ apply)

$$\sum_{i \text{elements}} V_i I_i = \phi$$

$V_i$ → Voltage across $I_i$ → current through

Passive sign convention hold on all elements

For our 2-input SC converter

$$\bar{a}^I \bar{v}^I + \bar{a}^\Pi \bar{a}^\Pi = \phi$$

$\bar{a}^I \bar{v}^I = a^I v^I = \phi$
SSL Output Resistance
Output Resistance

\[ \bar{a}^1 = \begin{bmatrix} -\frac{1}{2} & \frac{1}{2} & \frac{1}{2} \\ \end{bmatrix} \]

\[ \bar{a}^{11} = \begin{bmatrix} 0 & -\frac{1}{2} & \frac{1}{2} \\ \end{bmatrix} \]
Dickson Charge Vector Analysis
Dickson Output Resistance
Charge Vector Analysis in FSL
6:1 Dickson Converter Simulation
Simulation Comparison to Model

fixed $f_s = 1$MHZ

![Graph showing comparison between simulation and model results](image-url)
$R_o$ vs Switching Frequency

fixed $R_{on} = 10m\Omega$, $C_{fly} = 5\mu F$