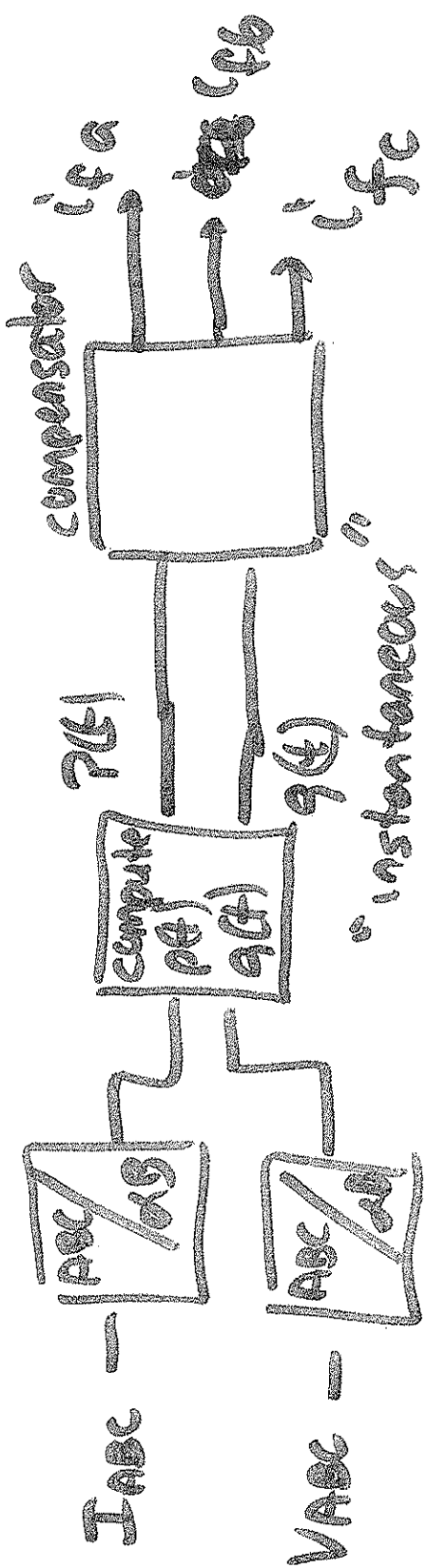
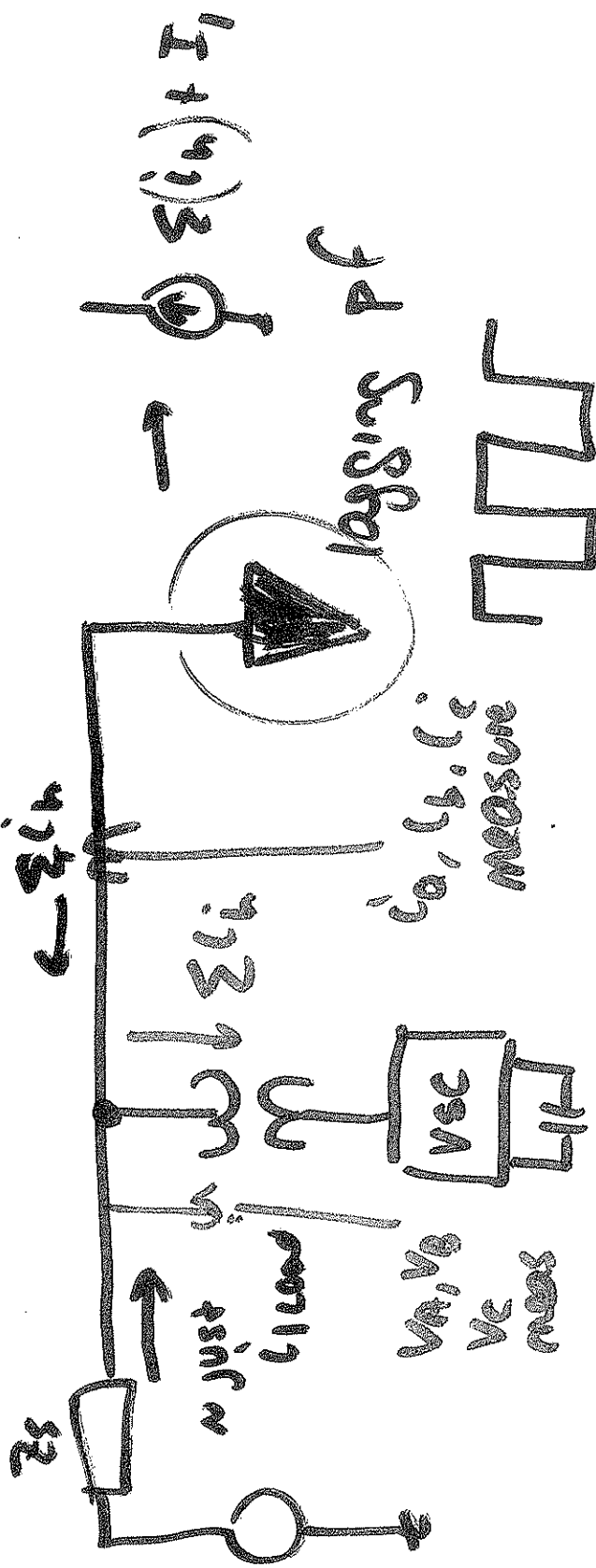


ECE 404-TD / 504-TD

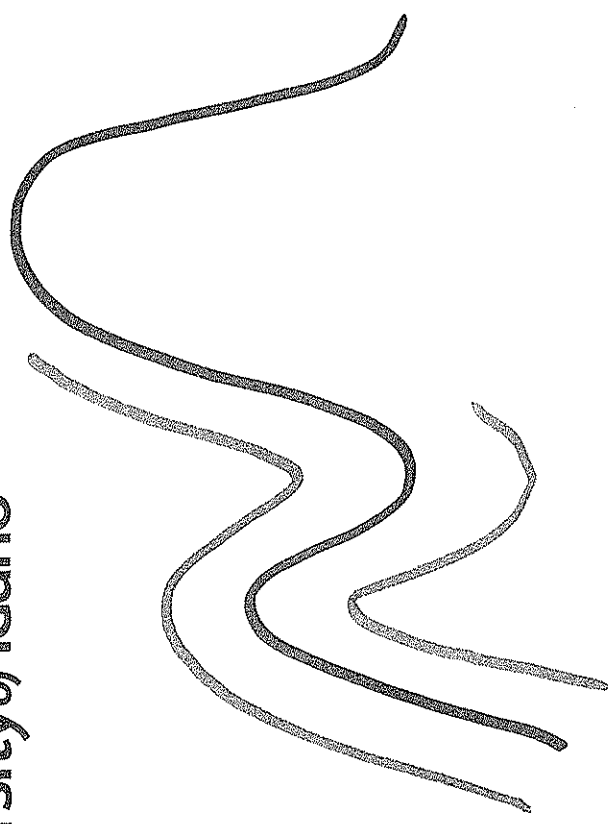
ST: T&D APPLICATIONS OF
VOLTAGE SOURCE CONVERTERS

SESSION no. 42

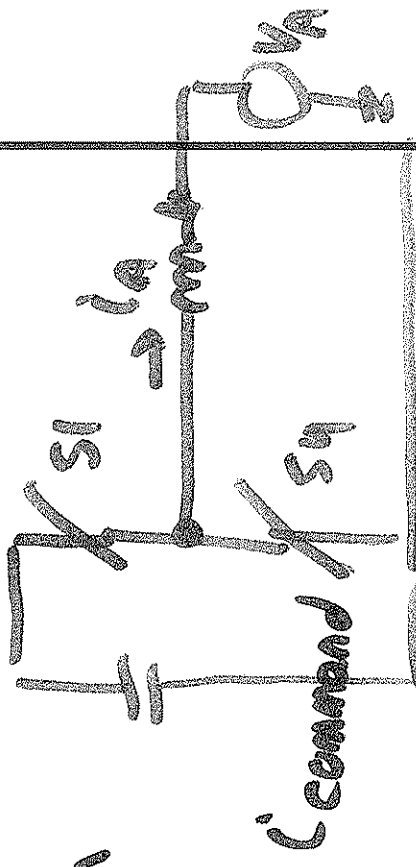


M/2 2/14

University of Idaho



hysteresis regulated PWM

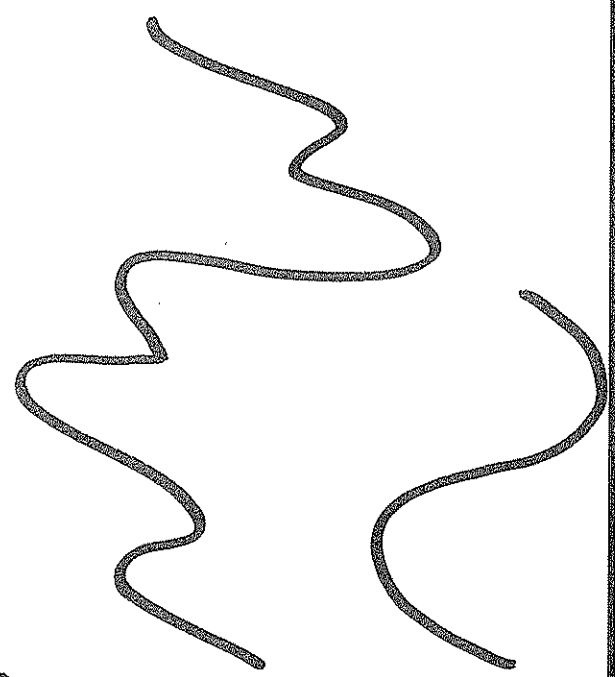


close S_1 , open S_2

command

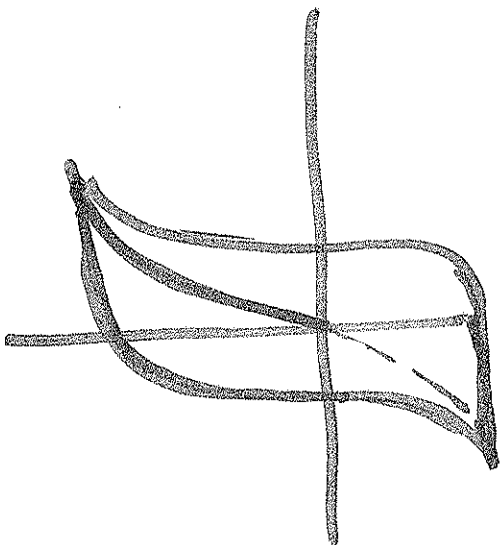
close S_1 , open S_2

S_1 closed
 S_2 open



University of Idaho

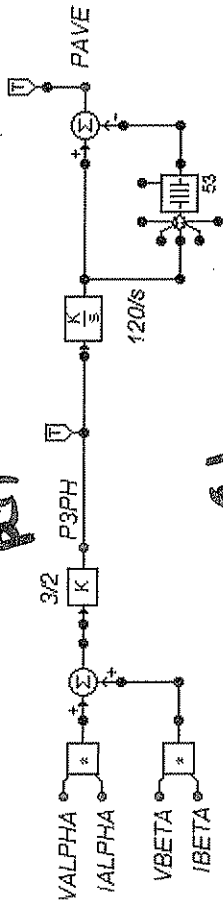
L42 4/14



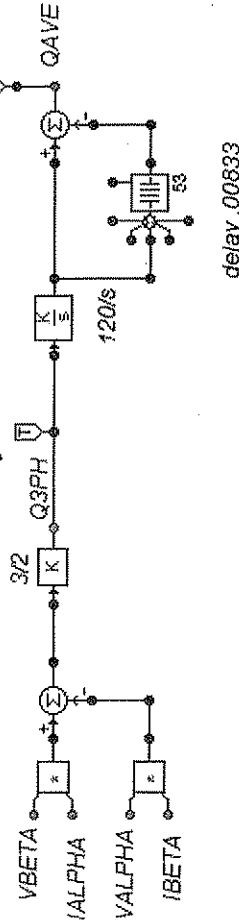
L42 5/14 L44 17/15

INSTANTANEOUS REAL AND REACTIVE POWER

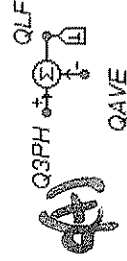
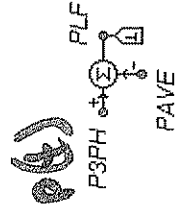
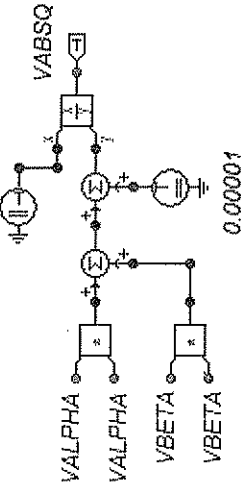
Low Pass Filter on P,Q



(P)

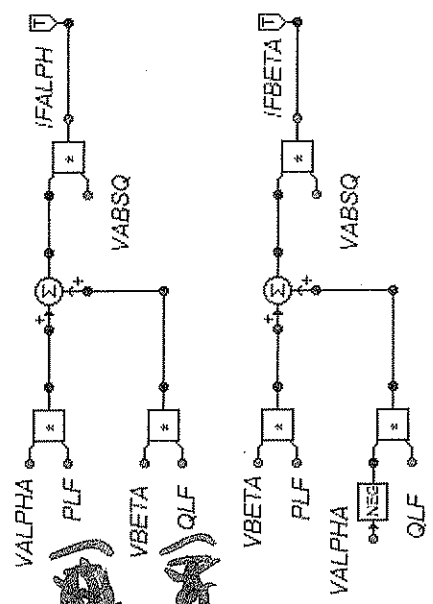


$$\frac{2}{3} \left(V\alpha^2 + V\beta^2 + 0.0001 \right)$$



Luz 6/14 Lul 18/15

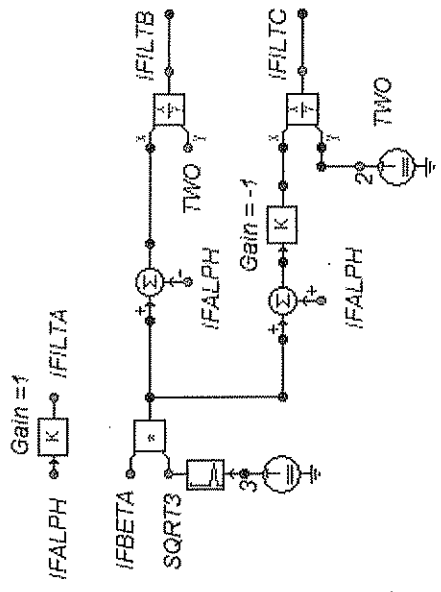
Compensator Currents in Alpha-Beta Frame



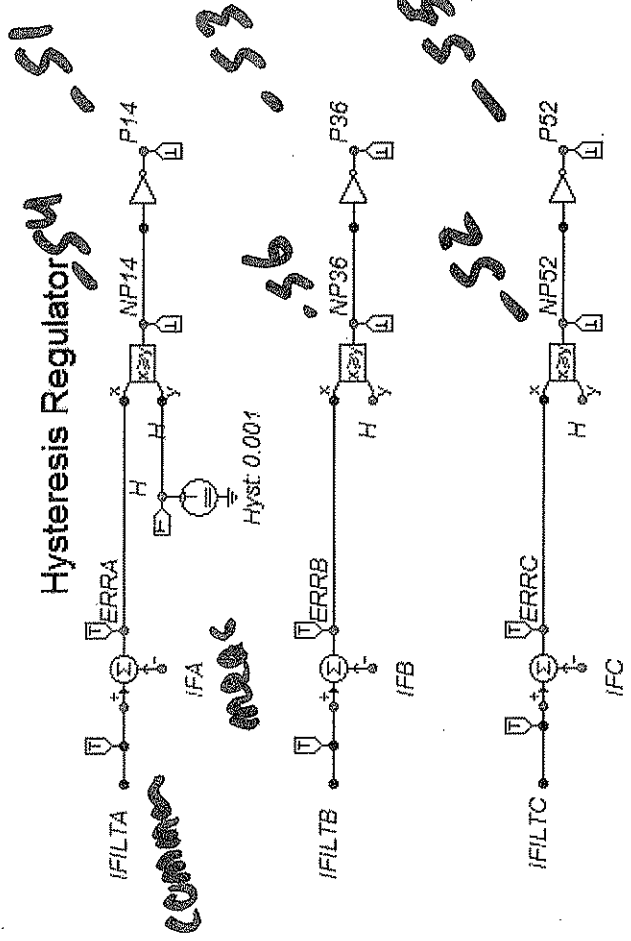
$P(s) - \frac{1}{s}$
 $Q(s) - \frac{1}{s}$

$\begin{bmatrix} V_{\alpha} & V_{\beta} \\ V_{\beta} & -V_{\alpha} \end{bmatrix} \begin{pmatrix} P(s) \\ Q(s) \end{pmatrix}$

Transform Filter Currents to ABC Frame



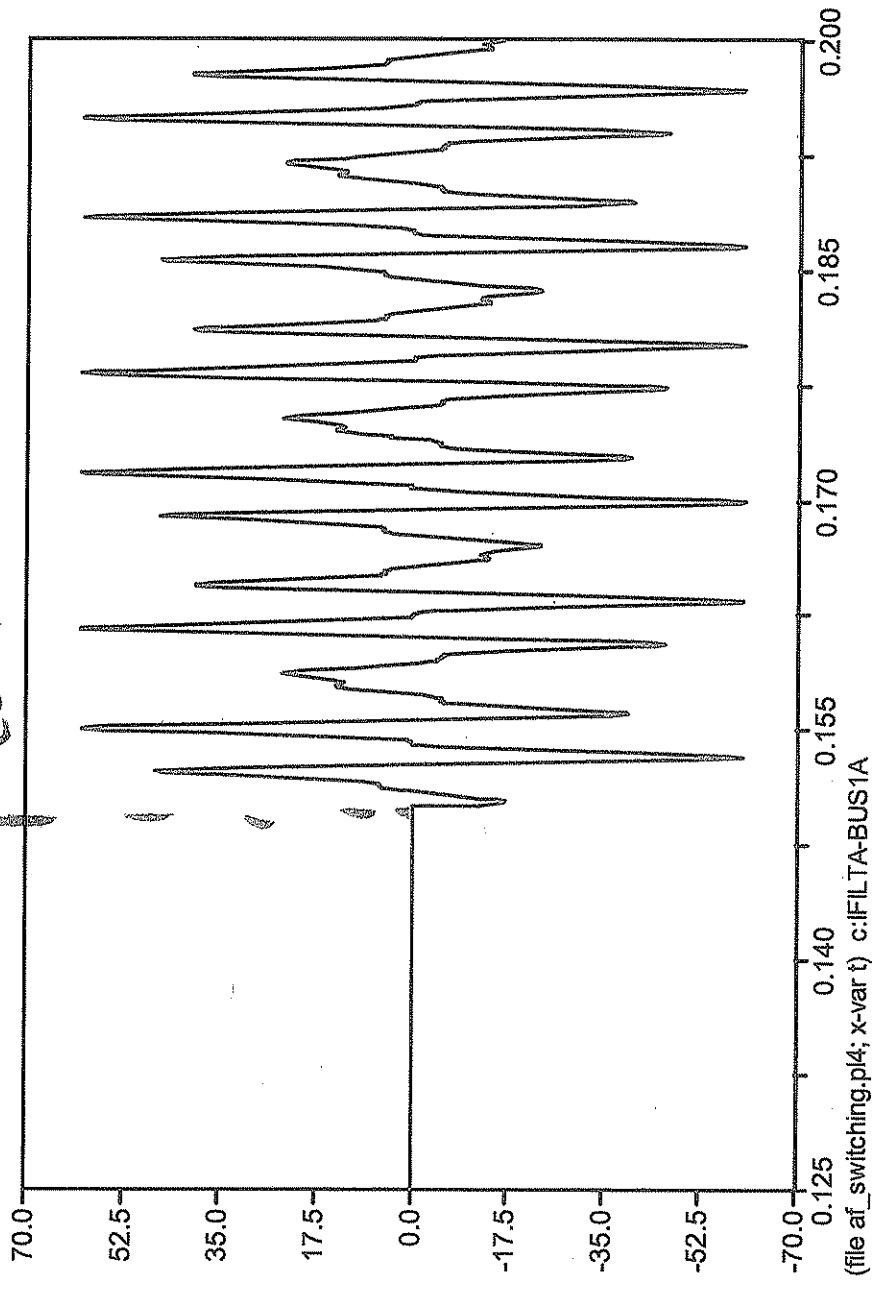
LUC 7/10 14 19/14



Luz 8/14

turn on
compensator

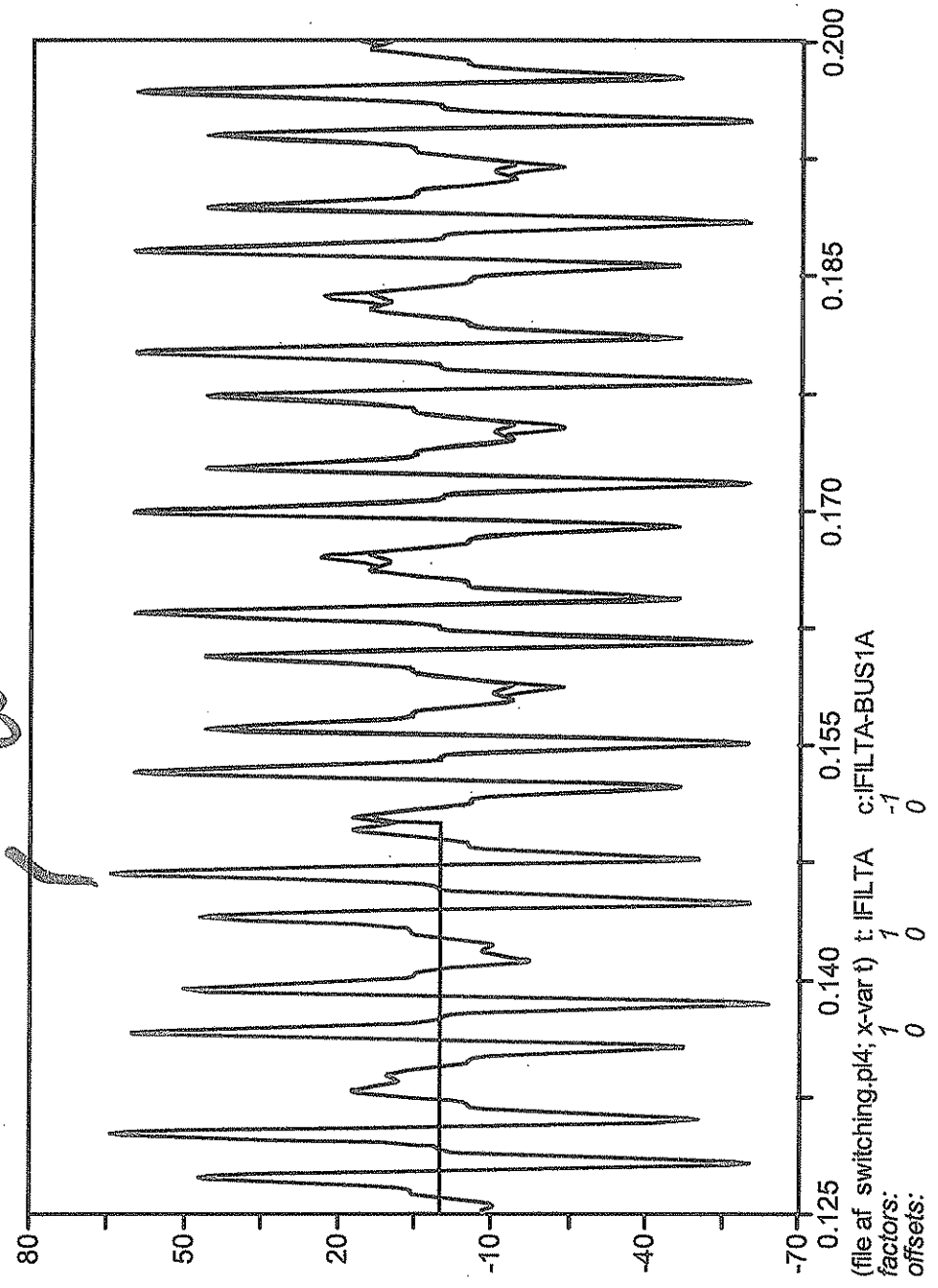
Compensator current



L42 9/14

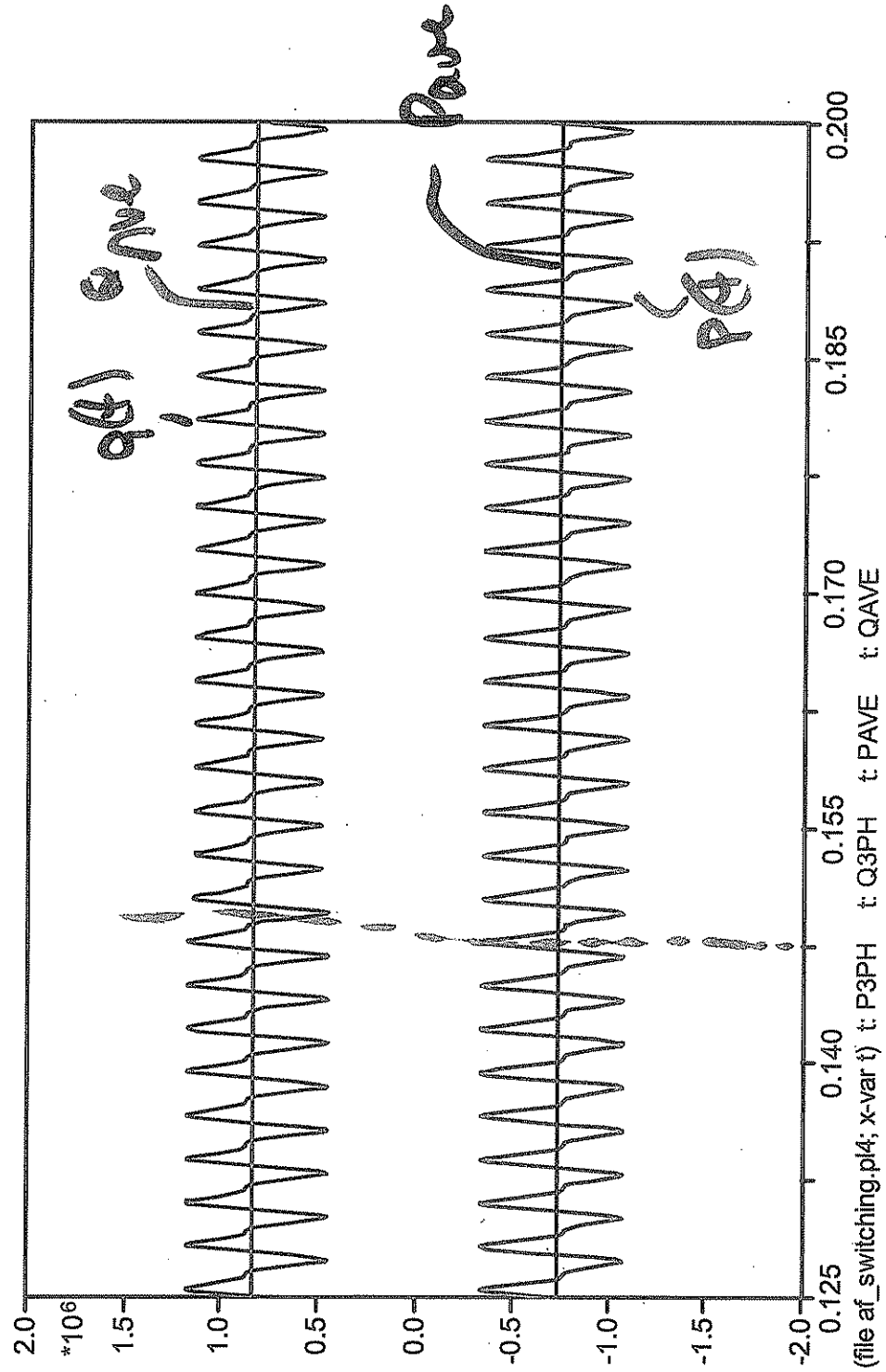
Commanded current and filter current

commanded current



L42 19/14

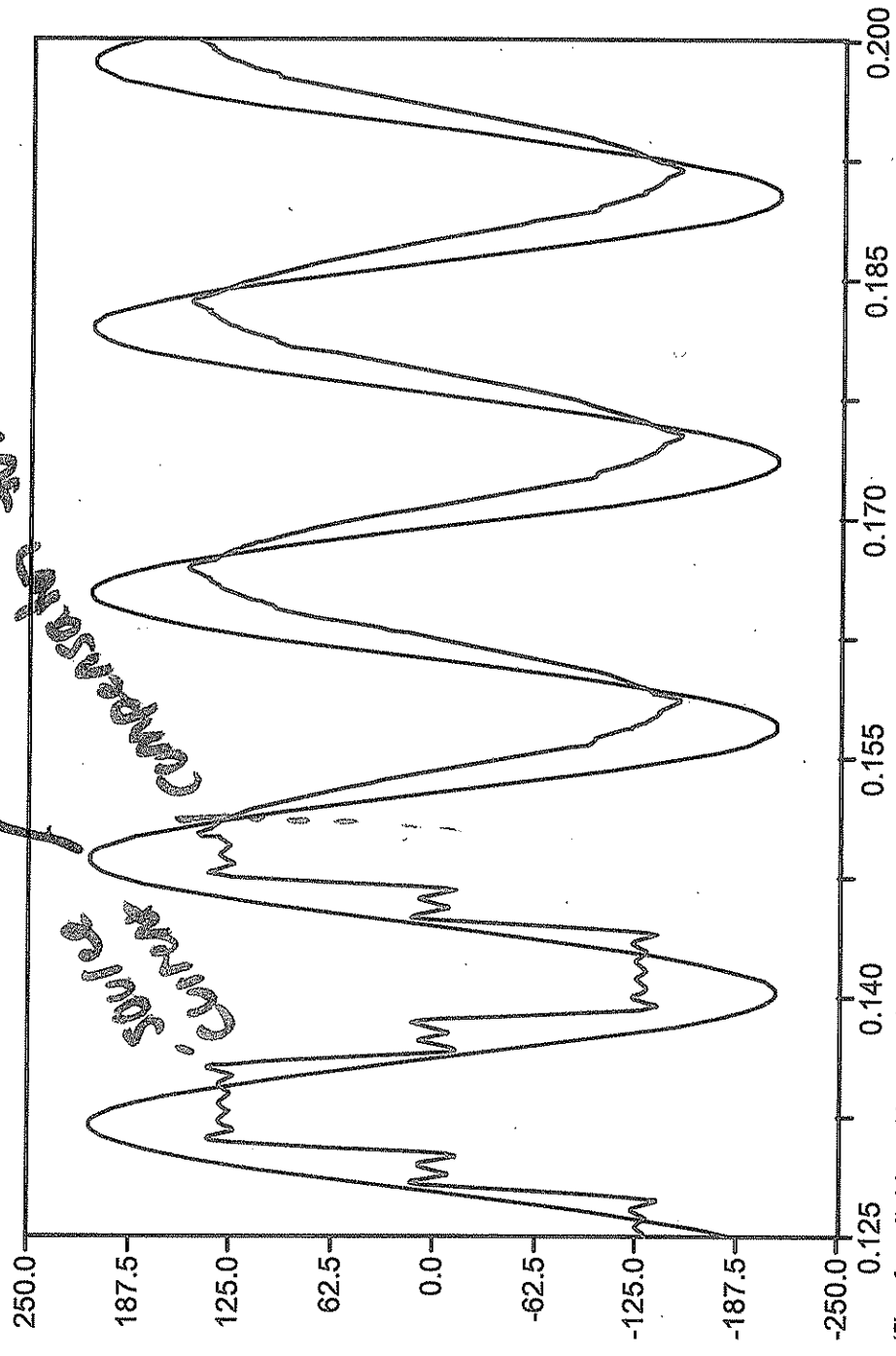
P and Q at the load



L42 11/14

Filtered Current and phase A voltage

*Voltage/100
wins of*



(file of switching.pl4; x-var t) v:VSA c:VSA -VSLA
 factors: 1 0.01 1
 offsets: 0 0 0

12/21/14
287

University of Idaho

- Switching frequency is
independent variable

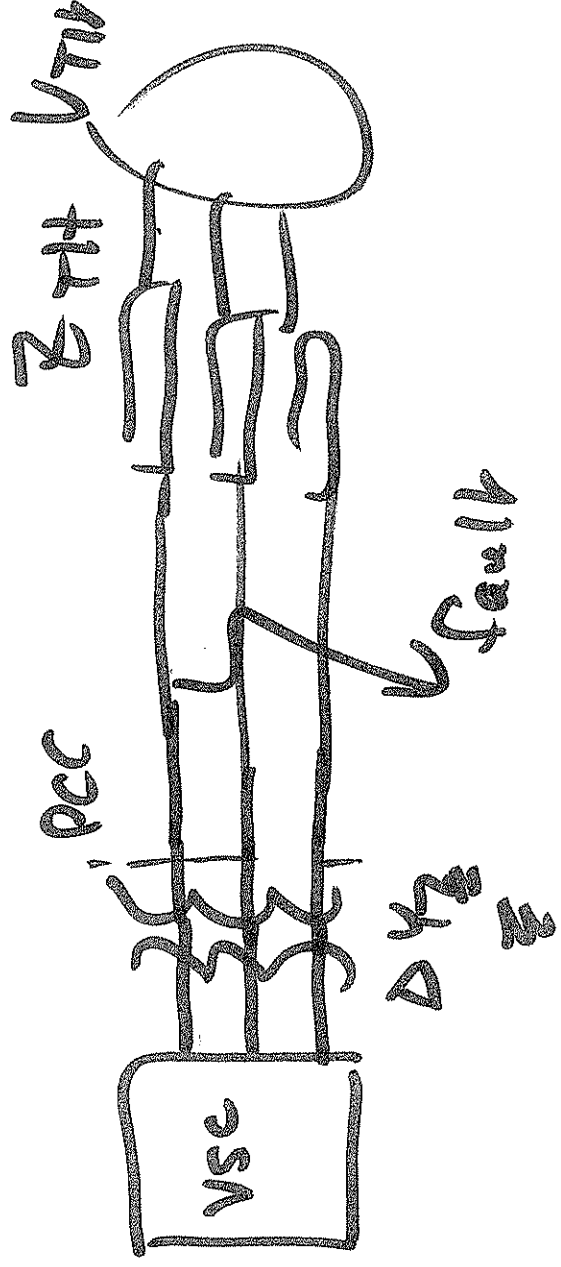
L42 13/14

University of Idaho

Current regulated PWM

- also sometimes used in response to external faults

(in general, not active filter)



very little
overload
capability

2/4/14 247

University of Idaho

- Older Fault limited
to 110% - 150% of rated
load current
- typically balanced 30 currents
- control power factor \rightarrow somewhat
leading