Current control in response to external faults
The main text:

- Converge will increase currents
- IC stop with current

Impact on current?

If circuit is balanced
- V's will exhibit unbalanced
  phase (of phase)
- V's will be reduced on faulted

Beyond the DC

If there is a fault on ac system

L43 2/9
- will not behave like a synchronous generator
- not a fixed magnitude/angle internal source

\[ E_{d'} \text{ on } E_{d''} \sqrt{R' + jX'_f}\]

- slowly time varying - stay at prefault value due to field constant
- Supply large currents
- Angle of currents dictated by \( \frac{E'}{Z_f} \)

\[ \downarrow \text{Impedance of fault path seen by the machine} \]

Voltage source converter does not do this, in any normal control mode.
Concurrent current supply
large currents in
problem with synch ref frame
3 phase

Negative sequence becomes
120 Hz oscillation
v_a, v_b, v_c
Converter control options/challenges

Challenge 1. Maintain synchronism
- PLL uses synch ref frame
  - Transformation & PI control
    - regulate $V_{sq} \rightarrow 0$
    - and determine w/ $A$ system

Unbalanced fault
- Negative sequence voltage maps to 120Hz
  - PLL need filter to block 120Hz in transformed domain (8.3.5)
Grid codes require low voltage 
ride control could be designed to 
refurbish supply 

2. Need to do some form 
that does not directly 
constant 

$P + P = 0$

at PCC or pcc lead
4. Current regulation options

(A) Load, Eq. 5, based on

Could have some unbalance in output
- Some ripple at 100 Hz

(B) Current regulated from 0 to guarantee balanced currents (balanced references)
balanced currents better for dc bus voltage ripple