Ongoing List of Topics:

- URL: http://www.ece.mtu.edu/faculty/bamork/EE5223/index.htm
- Term Project - last few proj/teams being firmed up and getting moving.
  - Follow timeline, see posting on web page (posted in week 5)
  - Formal outline w/complete references complete, get/keep cranking...
- Homework - problem on Cap Bank configuration & protection
- Wrapup on Cap banks issues
  - Protection of fuseless banks
  - Synchronous Switching to minimize transient overvoltages.
- Gen Protection - Ch. 8, IEEE Publication 95TP102 - Prot of Synch Gens
  - Basic Protection issues
  - Volts/Hz
  - Overspeed
- Next: Detailed overview - total overall Gen protection.
How to minimize transient?

EE 5210 - Power Systems Protection

Spring 2001
CB "timing"

- Statistical close times for each pole:
  \[ \pm 20 - 25 \text{ ms} \]

\[ \pm 1 \text{ ms} \] ?

\[ t_{close} \]
\[ \text{delay} \]

- When closing all 3 poles at once, the "pole span" is the time from 1st close to last.

EE 5210 - Power Systems Protection  
Spring 2001

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Externally Fused or Internally Fused

A

C

B

Trip

Don't Trip

\[ V_{\text{inner}} \]
SYNCH GENERATORS

Effect of System (or load) Power Factor:

LAGGING

OVER-excited
(\|\tilde{E}_A\| is > rated voltage)

UNITY

LEADING

Under-Excited
(\|\tilde{E}_A\| < rated voltage)
\[ E_{\text{rms}} = 4.44 \, k_m \, \mu \, f \, N \, \Phi_p \]

\[ B \propto \frac{E_{\text{rms}}}{F} \] volts/Hz

\[ B \] volts/Hz

\[ V \] volts

\[ V \] volts

\[ f \] frequency

\[ f \] frequency

\[ f = (60 \text{ Hz}) \]