Topics for Today:

- Announcements
  - Office hrs: 2:05pm-2:55pm Mon, Wed, Fri
  - Office: EERC 614. Phone: 906.487.2857
  - XFMR exercises posted on web page, due next Mon 9am.
  - Recommended problems from Ch.2, solutions posted

- XFMR, Chapter 2 - Transformers and circuits w/ transformers
  - Pre-Req Videos 3-6 - View them, study notes!
  - Single phase ideal transformer is building block - V, I, dot convention!
  - 3-phase transformer banks and phase shifts (ANSI/IEEE vs. IEC)
  - Standard 30°shift transformers, non-standard connections
  - Pos/neg sequence phase shifts, sequence networks.
  - Autotransformers
  - Load Tap Changing (LTC) transformers
  - Phase shifting transformers
  - Paralleling transformers with a) unlike impedances; b) unlike tap positions
  - Three-winding transformers
VA Advantage

\[ \frac{V_H}{V_x} = 3.00 \]

Rule of thumb:

\[ \geq 3 \rightarrow \text{high flux leak.} \]

\[ \ll \rightarrow \text{poor} \] \( \frac{2}{3} \)
\[ \begin{align*}
V \text{A}_{\text{auto}} &= \frac{(V_1 + V_2)I_1}{V_1 I_1} \\
\text{VA Advantage} &= \frac{V_H}{V_C} = \frac{V_1 + V_2}{V_C} \\
V &= \frac{V_1 + V_2}{V_C}
\end{align*} \]
One-Line Notations - IEEE

Don't be vague!

Provide polarity marks and phase shifts!

in EES223...
- 41 & X1 "Corners" not labelled!
- Dashed line missing (41)
- Applied & induced voltages not aligned!
"open-delta" or "broken delta"

\[ V_{TS} = \frac{P_x}{R_x} \]

\[ V_{ag} + V_{bg} + V_{cg} = 3V_{ao} \]
normal

3a

A-G Fault

Vag

Vcg

Vag

Vcg

3Vao

Vag

(-)

(+)
Pre-fault: $\mathbf{V}_a = 0$
During fault: $3\mathbf{V}_o$
Reverse: $2\mathbf{V}_{ll}$