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
SEQUENCE NETWORKS
FOR TRANSFORMERS

\[ I_0, I_1, I_2 \]

\[ x_1 \]

\[ x_2, x_3 \]

\[ A, B, C \]
Per Phase Equiv:

- \( V_{AN} \)
- \( L-N \) per phase equiv
- Per Unit Values:
TRAP: Text books have "cook-book" egns assuming that all transformers are std. 30°. WRONG!

MANY OTHER OPTIONS
±30°, ±90°, ±150°  Δ-Y Y-Δ
A

C

\[ I = I_{co} \]

\[ 2 \phi \]

N

2 \phi

B

\[ I = I_{co} \]

\[ I = 3I_{ao} \]

\[ G \]

\[ V_{drop} = 3I_{ao}Z_N = V_{NG} \]

A

\[ 2 \phi \]

\[ 3Z_N \]

\[ zero \ ref. \]
A0 → open → A0

open? (if Δ is open)

Zero Ref.
YNd3

\[ \pm 30^\circ, \pm 90^\circ, \pm 150^\circ \]