

EET 4350 – Homework Assignments

Homework 1 – From Eaton Power Systems formulas and Calculations – Video

Example 1 – Change 100 kVA to 125 kVA and recalculate all results

Example 2 – Change 75 kVA to 80 kVA and recalculate all results

Example 3 – Change 550 kVA to 650 kVA and recalculate all results

Example 4 – Change 10 kVA to 15 kVA and recalculate all results

Example 5 – Change 10 kVA to 15 kVA and recalculate all results

Homework 2 - From Eaton Power Systems formulas and Calculations – Video

Example 6 – Change 750 kVA to 850 kVA and recalculate all results

Example 7 – Change 500/6250 to 7000/8250 and recalculate all results

Example 8 – Change 1000 kVA to 1250 kVA and recalculate all results

Example 9 – Change 550 kVA to 650 kVA and recalculate all results

Example 10 – Change 500 kVA to 600 kVA and recalculate all results

Homework 3 –

Review Eaton Transformers 101 video

Homework 4 –

Review Bussman SCCR Part 1 Video

Homework 5 –

Review Bussman SCCR Part 2 Video

Homework 6 –

Review Bussman SCCR Part 3 Video

Homework 7 -

Eaton's White Paper **WP040009EN: "Harmonic Solutions Explained"**

1. What is the main purpose of Eaton's White Paper WP040009EN?
2. What types of loads are considered the most prevalent sources of harmonics today?
3. What are the four major "areas of concern" or symptoms caused by harmonic distortion?
4. Which IEEE standard is most relevant for harmonic control according to the paper?
5. What are the limits defined in IEEE 519 for individual frequency distortion and total harmonic current demand distortion (TDD)?
6. What is the "Point of Common Coupling" (PCC) in the context of harmonic standards?
7. Name three "individual load" harmonic mitigation techniques discussed in the paper.
8. What typical %THD (total harmonic distortion) reduction can a 5% line reactor achieve for a single drive load?
9. What are the advantages and disadvantages of using a DC choke (on the DC side of a drive) compared to an AC line reactor?
10. What is the role of isolation transformers in harmonic mitigation?
11. What is a "drive dedicated filter" (or broadband filter) as described in the paper?
12. How does a 12-pulse converter mitigate harmonics compared to a 6-pulse converter?
13. What makes an 18-pulse (differential delta) drive beneficial for harmonic cancellation?
14. Why are 24-pulse converters often used in medium-voltage drives?
15. What is an Active Front End (AFE) drive and how does it help mitigate harmonics?
16. What are "system-level" harmonic solutions (as opposed to individual load solutions)?
17. How does a tuned harmonic filter work, particularly for the 5th harmonic?
18. What is a neutral blocking filter and when would it be used?

19. Why is simply adding capacitors to correct power factor potentially risky in harmonic-rich systems?
20. How can reducing harmonics lead to cost savings in an electrical system?