QFT = **Q**uestion **F**ormulation **T**echnique

The Art & Science of asking questions

‘Small-Group Student Rules’ for ‘producing & asking questions’

i.	Ask as many questions as you can;	Gives license to ask.
ii.	Do not stop to discuss, judge, or answer any of the questions;	Creates safe space & protection.
iii.	Write down every question exactly as it was stated;	Levels the playing field so **ALL** questions and **VOICES** are **RESPECTED**.
iv.	Change all statements into questions	Insists upon the discipline of phrasing, asking, and thinking in Qs, NOT statements.

The QFT – Question Formulation Technique

Small Group Activity

Students Part

1. **Producing questions wrt the QFocus:** divergent thinking, any and all Qs w/o judgement or discussion

   (5 – 15 minutes; at least)

   - A question-recorder is needed in the small group
   - Record the exact question – grammar and all as asked
   - No discussion during this phase – questions only
   - Ask any question that comes to mind

2. **Improving the questions (Qs):**

   (10 minutes; at least)

   - Categorizing Qs as closed-ended (Qs with yes/no or one/few-word-answers) & open-ended (Qs that require explanation)
   - Change closed-ended questions into open-ended questions
   - Analyze the advantages & disadvantages of the questions (convergent thinking).
   - Relate the Q categories to the purpose of the project/activity

Note: the construction & phrasing of a question shapes the kind of information you can expect to receive.

3. **Prioritize your questions**

   (At least 10 minutes)

   A few of many possible options for prioritizing questions:

   - Chose the 3 most important Qs & then explain why you chose these 3.
   - Chose the 3 Qs that interest you the most & then explain why you chose these 3.
   - Chose the 3 Qs that will help you best design your solution to the project & then explain why you chose these 3.
   - Chose the 3 Qs that move you toward your purpose & then explain why you chose these 3.
   - Chose a single 'priority' Q & then explain why you chose this one.

This step summarizes your work in step 1 and 2.

4. **Next steps:** using the questions for action and follow-on research/inquiry

   (1 – 2 weeks of research and project report writing)

   A few of many possible options for prioritizing questions:

   - Report writing
   - Investigations
   - Support for instruction

5. **Reflection:** metacognition and 'questioning the questions'

   (10 – 15 minutes)

   Reflection examples:

   - What did you learn?
   - Whys is learning to ask your own questions important for learning?
   - What did you learn about on the QFocus topic of this particular project?
   - How did you learn?

ENGR-240 Project Grading Based on the 7 Deliverables

0. Cover page **NOT GRADED**

1. **Prioritized Questions:** Prioritize the 3 most important questions (usually these are the most provocative, or interesting, or ones that best helped you) that you thought of in response to the statement in the envelope.

   Points = _____

2. **Question Direction:** Identify how your questions led you on your search for answers.

   Points = _____

3. **Question Responses:** Document the responses to your questions based on your investigations.

   Points = _____

4. **Additional Questions:** What additional questions occurred during your investigation that need more study?

   Points = _____

5. **References:** List the references that you found in your investigation.

   Points = _____

6. **Reflection:** Finish the project with **INDIVIDUAL** reflection write-ups that discuss the above process and your responses. There will be 1 signed reflection page per small-group member. This is an individual input and not performed by the small group in-total.

   Points = _____ Total = _____

ENGR-240 Project Write-up Guidelines

Dr. Mowry

Small groups: 3 – 5 students per group. The cover page of your project response will include the names of your group. Everyone in the group will receive the same overall points score.

The 7 deliverables for our project write-ups:

0. Cover page
1. **Prioritized Questions:** Prioritize the 3 most important questions (usually these are the most provocative, or interesting, or ones that best helped you) that you thought of in response to the QFocus.
    - All question are valuable and should be documented "AS THEY ARE ASKED" – verbatim!!
    - No answering or judging of the merits of questions is allowed at this point in the project
    - Change any statement into a question; '**yes**' or '**no**' questions **NOT** useful
    - Questions need to be open-ended. Short-answers indicate close-ended questions

    This part of the group project may take an hour or more!!!

2. **Question Direction:** Identify how your questions led you on your search for answers.

3. **Question Responses:** Document the responses to your questions based on your investigations.

4. **Additional Questions:** What additional questions occurred during your investigation that need more study?

5. **References:** List the references that you found in your investigation.

6. **Reflection:** Finish the project with **INDIVIDUAL** reflection write-ups that discuss the above process and your responses. There will be 1 signed reflection page per small-group member. This is an individual input and not performed by the small group in-total.

Scoring:

- 50 points per project
- Scoring based on my assessment of your response to the deliverables

Key Habits for life-long learning[1]

1. **Evidence:** How do we know what's true or false? What evidence counts?
2. **Viewpoint:** How might this look if we stepped into other shoes, or looked at it from a different perspective?
3. **Connection:** Is there a pattern? Have we seen something like this before?
4. **Conjecture:** What if it were different?
5. **Relevance:** Why does this matter?

The Why, What If, and How of Innovative Questioning[2] (examples)

Why …

WHY do we have to wait for the picture?

WHY does stepping back help us move forward?

WHY do comedians see things that the rest of us missed?

WHY should you be stuck without a bed if I've got an extra air mattress?

WHY must we "question the question"?

What If …

WHAT IF we could map the DNA of music?

WHAT IF your brain is a forest, thick with tress? (And what if the branches touch?)

WHAT IF you sleep with a question? (Will you then wake with an answer?)

WHAT IF your ideas are wrong (and your socks do not match)?

How …

HOW can we give form to our questions?

HOW do you build a tower that doesn't collapse (even after you put the marshmallow on top?)

HOW can you learn to love a broken foot?

HOW might we create a symphony together?

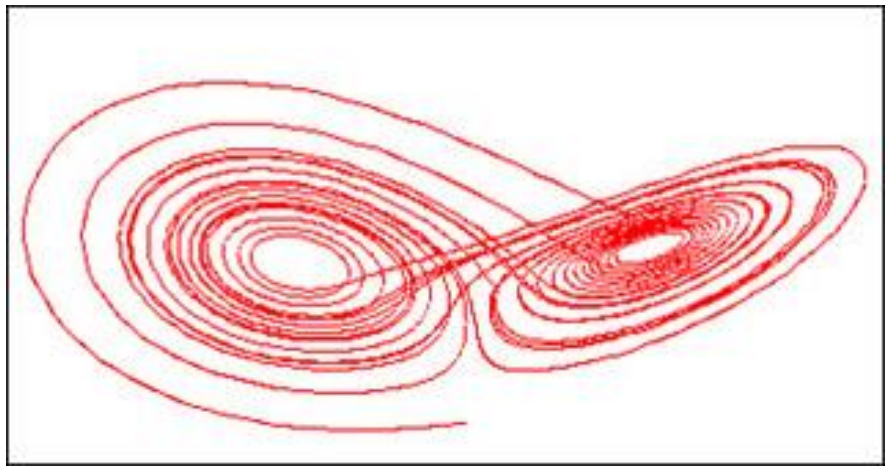
[1] 'A More Beautiful Question' by W. Berger, Bloomsbury, 2014, p51. [2] IBID, p71.

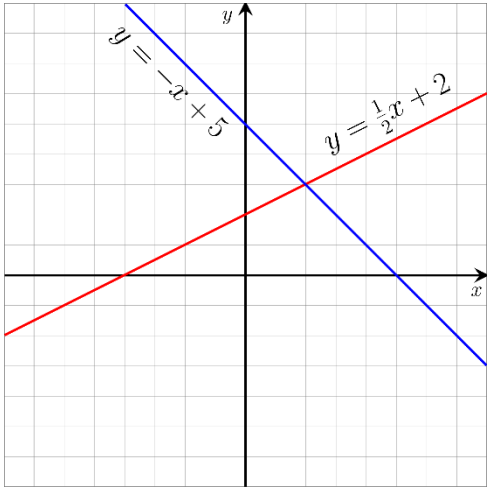
Sample Q Focus Statements for ENGR 240 Circuit Analysis Course

Project 1. Due Friday 12 Feb at the beginning of class

Ohm's Law is a LIE

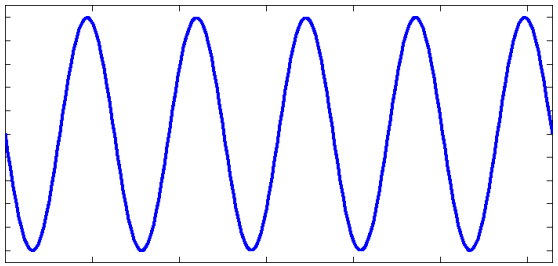
Project 2. Due Friday 26 Feb at the beginning of class





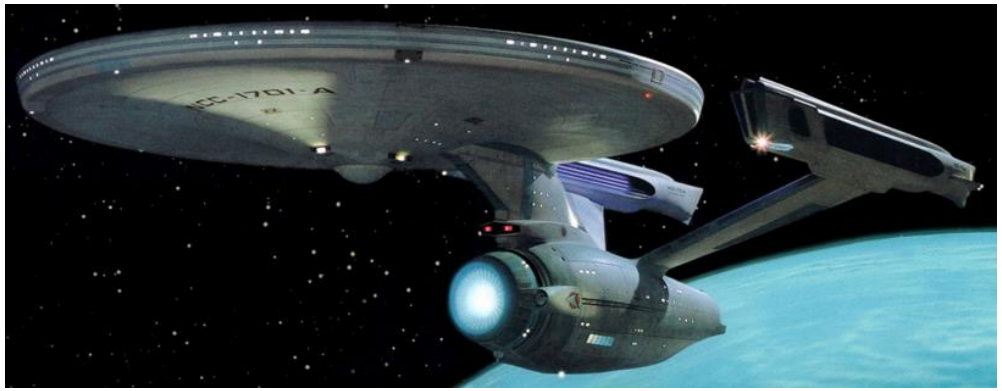
y = mx + b is not linear'ity

Project 3. Due Friday, 18 March at the Beginning of CLASS



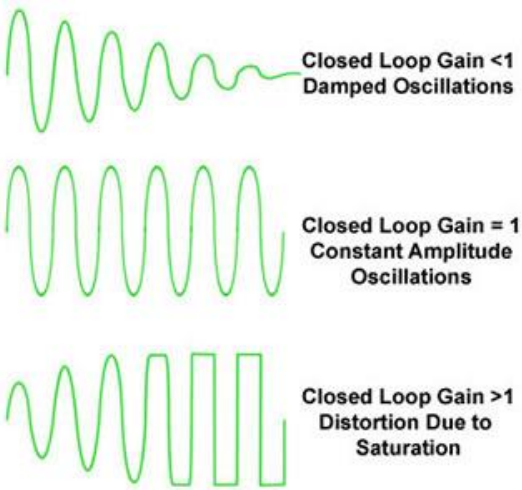
$$\frac{d^2x(t)}{dt^2} + a_1\frac{dx(t)}{dt} + a_2x(t) = f(t)$$

$$x(t) = x_p(t) + x_c(t)$$



PHASORS: The EEs weapon of Mass Production

Project 4. Due Friday, 22 April at the Beginning of Class



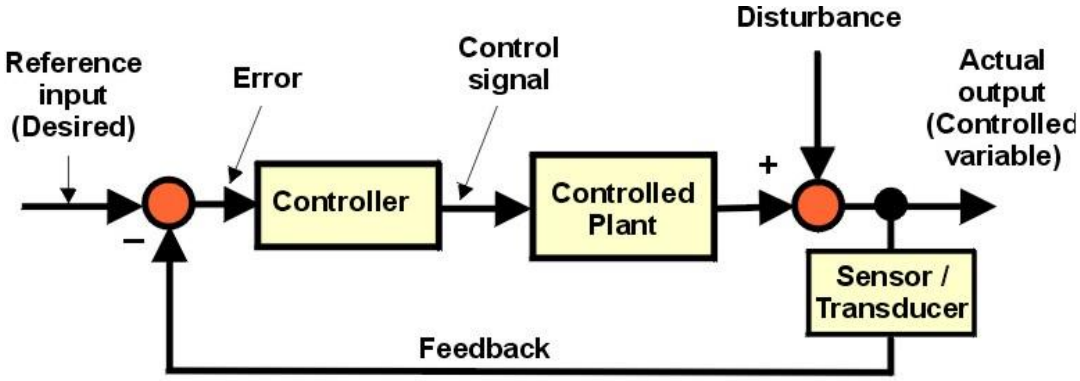


Fig.15: Feedback control system

OA Oscillators: Amazing