Topics for Today:

- All homeworks thru #7 must be completed by Mar 13th.
- Summary of Loadflow Program Output
  - Slack variables: P & Q “mismatch” at slack, PV buses
- Term Project: 1-paragraph proposal due 5pm Wed.
- Homework #8 - Due Wed 5pm (short extension possible)
- Constrained Optimization (discuss Problem 8.1)

Coming up:

- More on system operation, fault calcs, etc.
- Term project outline and references - due Mar 24th.
- Journal paper summary/presentation - Mar 31st
\[ \leq P_3 : P_{32} + P_{34} - P_{gs} + P_{load} = \text{Mismatch} \]

\[ \ &= P_{gs} + Q_{load} + Q_{shunt} = Q_{GS} \]
Load Flow Programs
- Converge \((P, Q)\)
- Branch Flows Calc.
- Slack Variables
  - \(P_{SLACK}, Q_{SLACK}\)
  - \(Q_{PV\ BUSES}\)

\[ \sum P_i = 0 \quad \& \quad Q_i = 0 \]
Page layout: Include page numbering.

Suggested layout:
1. Appendices as required to document details.
2. Reference list (number references [1], [2], etc. in order of first authors' last name).
3. Recommendations for continued work.
4. Conclusion.
5. Results (or in draft version the expected results).
6. Implementation (may not be complete in draft versions).
7. Development and implementation details.
8. Overview of basic ideas that you will develop and implement.
10. Identification of existing voids or weaknesses, and resulting opportunity.
11. Literature search, most important references.
12. Background.
13. Introduction (brief overview of project; problem area).
14. Literature overview, overview of project.
15. Executive summary (not needed for initial draft).
16. Title page.

Week 8 (week after spring break): submit short email with ideas(s) regarding instructor feedback.

Week 6 (Friday): submit rough draft of project report.
Week 10 (Friday): submit updated outline of project and complete reference list.
Week 12 (Friday): submit rough draft of project report.
Week 14 (Friday): submit final report/deliverable.
Week 16 (Friday): submit final version of project.

Time line and required submissions are as follows, all deliverables contribute to the grade:
- Presentation of the project.
- Written report of the project.
- Oral presentation of the project.

Time line:
- Preliminary work: Identify and explore potential topics.
- Literature review: Conduct a thorough literature review.
- Project development: Develop the project plan and execute the project.
- Project evaluation: Evaluate the project and prepare the final report.
- Project presentation: Present the project and defend the results.

For your term project, totaling 20% of your course grade:
- Project development: Develop the project plan and execute the project.
- Project evaluation: Evaluate the project and prepare the final report.
- Project presentation: Present the project and defend the results.

For your project, the following requirements are mandatory:
- Project scope: Clearly define the scope of the project.
- Project objectives: Clearly state the objectives of the project.
- Project deliverables: Identify the deliverables of the project.
- Project milestones: Define the milestones of the project.
- Project budget: Define the budget of the project.
- Project timeline: Define the timeline of the project.
- Project risk management: Identify the risks of the project and develop a risk management plan.
- Project communication plan: Develop a communication plan for the project.
- Project quality management: Ensure the quality of the project.
- Project change management: Manage the changes in the project.
- Project closure: Complete the project and submit the final report.

The project is expected to be completed within the scope of the project.

A term project shall be done in lieu of a final exam, you may work alone or with one partner.
Term Project - Comp. Methods

- EES200
- EES5240
- Web Page - URLs
- IEEE Xplore - URLs
- Industry Journals
- Project-inspired

5pm Wed: Paragraph.
What exactly is lambda? Write a short explanation of what it means. Contrast between what is the objective function and the constraint. Also label the region where only the equality applies.

What is the lambda of an individual generator? Also label the region where only the equality applies.

When the inequality constraints are active (i.e., minimum or maximum output output limits of per unit, Clearly label the regions.

Show your calculations. (The lambda where asked for is the objective function lambda.)

Determine how to optimally schedule the generation for the 4 cases given in the table above.

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<th>2:30 p.m</th>
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System Lambda

\[
0 + 200 p_e = \frac{dG}{dt} \\
0 + 200 p_e = \frac{dG}{dt}
\]

Two power plants in a system are operating under economic dispatched constraints. For this flow study,

Flow studies:

Information is needed that might not be directly available to someone who is running the load at a particular unit. What bit of information is needed? Write a short explanation of how this technique can be used for planning studies. What bit of information is needed? Write a short explanation of how this technique can be used for planning studies.

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Three unacceptable bus voltages with shunt capacitors and shunt reactors:

Objectives: Constraining minimization via Lagrange multipliers, lossless optimal dispatch, correcting unacceptable bus voltages with shunt capacitors and shunt reactors.
\[ g(x, y) = -y + 2x + 8 = 0 \]

\[ L = x^2 + y^2 - \lambda (-y + 2x + 8) \]

\[ \frac{\partial L}{\partial x} = 2x - 2\lambda \]

\[ \frac{\partial L}{\partial y} = 2y + \lambda \]

\[ \frac{\partial L}{\partial \lambda} = -2x + y - 8 \]

\[ x = \_ \]

\[ y = \_ \]

\[ \lambda = \_ \]
Lagrange:

Min: \( f(x, y) = x^2 + y^2 \)

Subject: \( y = 2x + 8 \)

"N+1 Space"

Search Space (Feasible Soln Space) is \( N \)-dimensional.