Differential equations I, Math. 820

MWF, 0330PM, EA 295

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This quarter we will study the fundamental notions important in understanding differential systems and continuous dynamical systems. The prerequisites are: elementary theory of differential equations, complex analysis.

- Review of properties of differential equations.
- Lower order systems, phase portraits.
- Existence and uniqueness theorems.
- Linear systems, overview.
- Singularities of linear systems.
  - Singularities of first kind.
  - Singularities of second kind.
  - Normal forms.
- Eigenvalue problems; completeness of eigenvectors.
- Integrable and chaotic systems. Criteria of solvability.
- Equilibria.
- Stability (local, global, asymptotic).
• The Poincaré-Bendixson theorem.

• Global nonlinear techniques.

Other subjects will be added, if they are of special interest to students.

References

