MATH 250 EXAM 2 REVIEW SHEET

Second order linear equations

- **Linear equations with constant coefficients**

  - General solution in case of distinct real roots
  - General solution in case of complex roots
  - General solution in case of repeated roots
  - Solving IVP, limiting behaviour for different initial data
  - Solving characteristic equations in terms of an unknown parameter

- **Linear independence and the Wronskian**

  - Definition of the Wronskian
  - Abel's theorem

- **Reduction of order**

- **Method of undetermined coefficients**

  - Finding the form of a particular solution of a nonhomogeneous equation
  - Finding the form of the general solution of a nonhomogeneous equation
  - Finding the general solution of a nonhomogeneous equation, solving for unknown coefficients

- **Mechanical vibrations**

  1. Free vibrations

     - Setting up and solving a spring-mass system
     - Undamped: finding frequency, period, amplitude and phase of motion
     - Damped: finding quasifrequency, quasiperiod, amplitude and phase

  2. Forced vibrations

     - Setting up and solving forced spring-mass system
     - Undamped case: "beat" vs. resonance
     - Damped case: transient solution and forced response