LECTURE 1

1 Laplace Transform

- Definition
- Notation F $\mathcal{L}f$ *original* *transform*
  inverse Laplace transform
- Examples
  - $f(t) = 1$,
  - $f(t) = t$
  - Exercise: $f(t) = t^2$; $f(t) = t^n$
  - $f(t) = e^{at}$, Special case: $a = 0$
- Promise to use it in:
  - differential equations
  - integral equations
  - some other problems
- PROPERTIES
  - Linearity
    - Example: $f(t) = \cosh at$
    - Exercise $f(t) = \sinh at$
  - First shift theorem
    - Example $f(t) = e^{at}$.
- Laplace transform of derivatives
  - Laplace transform of the first derivative
  - Laplace tansform of the second derivative
  - Exercise: Laplace transform of the n-s derivative.
  - Example: Laplace transform of sine and cosine
- Initial problem for differential equations