

LECTURE 2

Laplace Transform

continuation

- Initial value problem
 - setting of the problem
 - general pattern of solution
 - definition: Inverse Laplace transform
 - Example: $y''(t) - y(t) = t$, $t > 0$, $y(0) = y_0$, $y(1) = y_1$.
 - table of inverse LT
 - (?) recall: simple fractions expansion
 - some different cases:
 - * shifted data problem
 - * problems with values in two various points
- Laplace transform of integral
- Heaviside function and its applications
 - definition of the Heaviside function
 - Heaviside function as a tool for truncation, examples
 - Heaviside function as a tool for shift, pictures
 - t -shift theorem
 - example: find $\mathcal{L}(u(t - \pi/2) \cos t)$
- δ -function
 - mechanical sense of the right-hand side in the initial problem
 - unit impuls impact
 - "definition" of δ -function
 - Laplace transform of the δ -function
 - Example:
 $y'' + 4y' + 5 = \delta(t - 1)$, $y(0) = 3$, $y'(0) = -5$.