

1) Nonhomog. System Via Matrix
Exponential :

03/12/12

$$\vec{x}' = A \vec{x} + \vec{f}(t)$$

Rewrite $\vec{x}' - A \vec{x} = \vec{f}(t)$

Integrating factor e^{-tA} :

$$(e^{-tA} \vec{x})' = e^{-tA} \vec{f}(t)$$

$$\Rightarrow e^{-tA} \vec{x} = \int_0^t e^{-sA} \vec{f}(s) ds + \vec{C}$$

Hence
$$\vec{x}(t) = e^{tA} \int_0^t e^{-sA} \vec{f}(s) ds + e^{tA} \vec{C}$$

exactly the same as we obtained from variation of parameters. (One still needs to compute e^{tA} !)

2) Review for Final (Part 1)

1) 2nd order linear eqⁿ.

$$ay'' + by' + cy = f(t).$$

2) Linear transformations.