

## Forced state response

002 | 1/1

By an argument similar to that in the "homogeneous" response notes (001), we can solve the state equation with nonzero inputs:

$$\dot{\bar{x}} = A\bar{x} + B\bar{u}$$

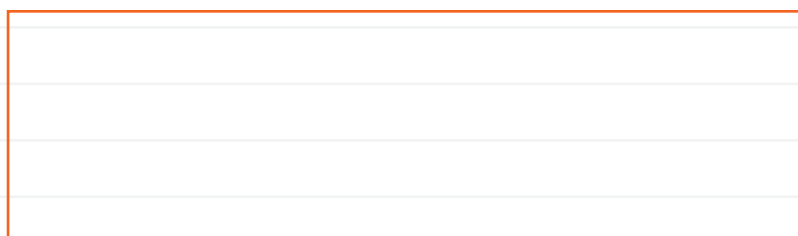
If we use the matrix exponential  $e^{-At}$  as an integrating factor, we can solve the system of ODEs as follows:

$$\dot{\bar{x}} = A\bar{x} + B\bar{u}$$

Integrating,

$\implies$

or



Note: matrix + vector differentiation and integration are defined **element-wise**.

For instance,