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10.1.2 Canonical form for a linear system IVP

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MO2.4 MO2.8

Recall the canonical form of an IVP as given in Equation (8.36)

$$\frac{d\underline{u}}{dt} = \underline{f}(\underline{u}, t) \tag{10.1}$$

For the case of a linear system, $\underline{f}$ will be a purely linear function of u and so can be written in the following form:

$$\underline{f}(\underline{u}, t) = A\underline{u} + \underline{b}(t) \tag{10.2}$$

where A is an $M \times M$ matrix and for the purposes of this class, we will assume A does not depend on time. The length M vector $\underline{b}(t)$ is a function of time, but not $\underline{u}$. The governing system of differential equations for this case can then be written as:

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