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\[ f(t) \quad \text{se: fit} \]
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\[ e^t \]

\[ \frac{d}{dt} m \]

\[ I = m \]

\[ \frac{1}{x} \]

\[ \frac{1}{e} \]

\[ \frac{1}{\omega} = 0 \]

\[ \frac{1}{\epsilon} \]
2. Given the system below. Write the differential equations of the system. Use the individual component equations and then derive the Cauchy form. (2 first order equations)
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\[ f(t) \]
2. Given the system below. Write the differential equations of the system. Use the individual component equations and then derive the Cauchy form. (2 first order equations)

\[ M \rightarrow f(t) \rightarrow x(t) \]

\[ T : m \]

\[ k \]

\[ f(t) = f_0 \]

Initial conditions:
\[ x(0) = 0 \]
\[ v(0) = 0 \]

\[ w = 0 \]
2. Given the system below. Write the differential equations of the system. Use the individual component equations and then derive the Cauchy form. (2 first order equations)
2.) Given the system below. Write the differential equations of the system. Use the individual component equations and then derive the Cauchy form. (2 first order equations)

\[ f(t) \]

\[ x(t) \]

\[ f(t) \rightarrow x(t) \]

\[ I: m \]

\[ v = 0, \quad a = 0, \quad \dot{x} = \ddot{x} \]

\[ 1\ddot{x} - v_0 \]
2.) Given the system below. Write the differential equations of the system. Use the individual component equations and then derive the Cauchy form. (2 first order equations)

\[ f(t) \]

\[ f(t) \]

\[ x(t) \]

\[ \dot{x} \]

\[ \ddot{x} \]

\[ m \]

\[ \ddot{x} + \frac{1}{\omega_0} \dot{x} + \frac{1}{\omega_0^2} x = 0 \]
2. Given the system below. Write the differential equations of the system. Use the individual component equations and then derive the Cauchy form. (2 first order equations)
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\[ \begin{align*}
T & : m \\
\frac{1}{12} & \\
K & \\
\end{align*} \]
2.) Given the system below. Write the differential equations of the system. Use the individual component equations and then derive the Cauchy form. (2 first order equations)
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![System Diagram]

\[ T = m \]
\[ 12 \]

\[ R \]
\[ \dot{x} = 0 < 1.5 \]
\[ 1.5^{1.5} x \]

\[ \xi_0 \]
\[ v_0 = 0 \]
\[ s = \text{fit}_1 \]
2. Given the system below. Write the differential equations of the system. Use the individual component equations and then derive the Cauchy form. (2 first order equations)
2. Given the system below. Write the differential equations of the system. Use the individual component equations and then derive the Cauchy form. (2 first order equations)
equations)

\[ \begin{align*}
T & = m \frac{\dot{v}}{12} \\
E_0 & = \frac{1}{2} \kappa \theta^2 \\
E_1 & = \frac{1}{2} \kappa \theta^2 \\
\end{align*} \]
equations)

\[
\begin{align*}
T &= m \frac{1}{2} \\
E &= \frac{1}{2} k x^2 \\
\mathbf{f}_1 &= \mathbf{f}_2 \\
\mathbf{e}_1 &= \mathbf{e}_2
\end{align*}
\]
equations)

\[ \begin{align*}
T &= m \\
\frac{1}{2} &\\
\end{align*} \]

\[\begin{align*}
\dot{x} &= 1 \\
\ddot{x} &= 1 \\
\end{align*}\]

\[\begin{align*}
\frac{1}{2} &< \frac{3}{4} \lesssim 1 \\
\end{align*}\]

\[\begin{align*}
0 &< \frac{3}{4} \\
\end{align*}\]

\[\begin{align*}
\varepsilon &= \sigma E \\
\varepsilon_{\text{f1}} &= \sigma_{\text{f1}} \\
\varepsilon_{\text{f2}} &= \sigma_{\text{f2}} \\
\end{align*}\]

\[\begin{align*}
\varepsilon &= \sigma E \\
\varepsilon_{\text{f1}} &= \sigma_{\text{f1}} \\
\varepsilon_{\text{f2}} &= \sigma_{\text{f2}} \\
\end{align*}\]
\[ T = m \]
\[ f(t) \]

\[ f_1 = f_2 \]

\[ e_1 = s e_1 \]

\[ x(t) \]
equations

\[ T_1 : m \]
\[ T_2 \]

\[ \Delta F - 8 \frac{1}{2} \leq \theta^3 \cdot \frac{1}{2} R \]

\[ \Delta 0 = 0 \]
\[ \frac{1}{2} \Delta \]

\[ R \]

\[ \ell_1 = \ell_1 \]
\[ \ell_1 = f_2 \]
\[ f(t) \quad \text{equations)\)

\[ M \quad f(t) \quad \dot{x}(t) \quad \ddot{x}(t) \quad f(t) \quad \text{SE: f(t)} \]

\[ T: m \quad T_1 \quad T_2 \]

\[ \Sigma F = \Sigma \tau = 0 \]

\[ F_1 - F_2 = 0 \]

\[ \Sigma M = 0 \]

\[ I \]

\[ \text{SE}_1 \]

\[ \text{SE}_2 \]
Equations:

\[ x(t) = f(t) \]

I: \[ m \]

\[ T_1 \]

\[ T_2 \]

\[ S - 8 \quad \frac{1}{2} \quad \theta \quad \frac{3}{4} \quad 1 \quad 50 \]

\[ \varepsilon = 0 \quad \varepsilon_w = 0 \quad \delta \]

\[ 1 \quad \dot{x} - \ddot{v}_0 \]

\[ R \]

\[ e_1 = SE_1 \]

\[ T_1 = f_2 \]
\[ F \]
\[ f(t) \]
\[ x(t) \]
\[ \text{S.E.: f(t)} \]

\[ I: m \]
\[ T_1 \]
\[ T_2 \]

\[ \mathbf{F} = \mathbf{K} \mathbf{e} \]

\[ \mathbf{v}_0 = \mathbf{v} + \mathbf{v}_0 \]
\[ a = \frac{\mathbf{v}_0}{t} \]

\[ \mathbf{e}_1 = \text{S.E.} \]
\[ \mathbf{t}_1 = \mathbf{f}_2 \]
\[ \begin{align*}
\mathbf{SE} & = \mathbf{f}(t) \\
\mathbf{f} & = m \mathbf{T} \\
\mathbf{T} & = T_1 - T_2 \\
T_1 & = k \mathbf{e} \\
T_2 & = k \mathbf{f} \\
\mathbf{e} & = \mathbf{v} - \mathbf{v}_0 \\
\mathbf{v} & = \mathbf{u} - \mathbf{u}_0 \\
\mathbf{u} & = \mathbf{a} - \mathbf{a}_0 \\
\mathbf{a} & = \mathbf{c} - \mathbf{c}_0 \\
\mathbf{c} & = \mathbf{d} - \mathbf{d}_0 \\
\mathbf{d} & = \mathbf{e} - \mathbf{e}_0 \\
\mathbf{e}_0 & = \mathbf{f}_2 \\
\mathbf{f}_1 & = \mathbf{f}_1 \\
\mathbf{f}_2 & = \mathbf{f}_2
\end{align*} \]
equations)

\[ R \]

\[ f(t) \]

\[ x(t) \]

\[ \varepsilon(t) \]

\[ \ddot{x} + \frac{1}{T_1} \frac{d}{dt} \varepsilon(t) + \frac{1}{T_2} \varepsilon(t) = \frac{1}{T_1} \frac{d}{dt} \varepsilon(t) + \frac{1}{T_2} \varepsilon(t) \]

\[ \varepsilon(0) = 0 \]

\[ \varepsilon(t) = 0 \]

\[ \ddot{x}(t) = \frac{1}{T_1} \varepsilon(t) \]

\[ \dot{x}(t) = \frac{1}{T_1} \ddot{x}(t) \]

\[ x(t) = \frac{1}{T_1} \dot{x}(t) \]

\[ \dot{x}(0) = \dot{x}_0 \]

\[ x(0) = x_0 \]

\[ \varepsilon(t) = \varepsilon_1 \]

\[ \ddot{x}(t) = \ddot{x}_2 \]

\[ x(t) = x_1 \]

\[ f(t) = f_2 \]
equations)

\[ f(t) \]

\[ x(t) \]

\[ f_1(t) \]

\[ f_2(t) \]

\[ T_1 = m \]

\[ T_2 \]

\[ S \]

\[ k_1 \]

\[ k_2 \]

\[ \theta \]

\[ v_i = 0 \]

\[ \dot{v}_i = 0 \]

\[ \ddot{v}_i = 0 \]

\[ \dddot{v}_i = 0 \]

\[ \epsilon_1 = SE_1 \]

\[ \epsilon_1 = f_1(t) \]

\[ \epsilon_1 = f_2(t) \]
\[ T : m \\
T_1 \quad T_2 \]

\[
\begin{align*}
S_1 &= \frac{3}{2} k + 0 < 3 \frac{1}{k} \geq 0 \\
S_0 &= \frac{v}{w} = 0 \\
\frac{1}{k} &= 1 \frac{x}{v} \\
R &= 1 \frac{1}{k} \geq 0 \\
\end{align*}
\]

\[ e_1 = s e_1 \\
\frac{t_1}{t_2} = f_2 \\
e_2 = e_1 - e_3 \\
\frac{t_2}{t_1} = \frac{1}{t_2} \geq 0 \]
\( f(t) \) - \( f(t) \)

\[
\begin{align*}
T_1 & = m \delta \\
T_2 & = \frac{k^2 - 8}{4k^2} \\
E_1 & = \frac{1}{2} k \delta^2 \\
E_2 & = E_1 - E_3 \\
f_2 & = \frac{1}{2} f_2 \\
\frac{dp_2}{dx} & = .
\end{align*}
\]
equations)

\[ F = F_1 + F_2 \]

\[ \frac{d^2 x}{dt^2} + \frac{K}{M} x = f(t) \]

\[ \tau = m \theta \]

\[ \tau_1 = \frac{1}{2} k \theta \]

\[ e_1 = 5e_1 \]

\[ e_2 = e_1 - e_3 \]

\[ t_1 = t_2 \]

\[ \frac{dp_2}{dt} = e_2 \]
equations)

\[ f(t) \]
\[ x(t) \]
\[ \tau \]
\[ S \]

\[ T_1 \]
\[ T_2 \]

\[ F \]
\[ M \]
\[ I \]

\[ e_1 = S e_1 \]
\[ f_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{I_2} p_2 \]
\[ \frac{dp_2}{dt} = e_2 \]
\[
T_1 = mV_1 \quad T_2 = mV_2
\]

\[
SF I = \frac{1}{2} I^2 R \quad 3 \quad f \quad 50
\]

\[
\begin{align*}
E_0 &= 5^2 \\ v_w &= 0 \quad 5^2 \\
\end{align*}
\]

\[
\begin{align*}
e_1 &= 5E_1 \\ t_1 &= f_2 \\ e_2 &= e_1 - e_3 \\ t_2 &= \frac{1}{I_2} I_2 \\ \frac{dI_2}{dt} &= e_2
\end{align*}
\]
\[ T : m \]
\[ T_2 \]
\[ F_k = \frac{1}{2} k x^2 < \frac{3}{4} k' x^3 \]
\[ F_0 \quad v_w = 0 \quad \frac{1}{2} f \]
\[ R \quad x = x_0 - v_0 t \]

\[ e_1 = s e_1 \]
\[ t_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{2} t_2 \]
\[ d p_{e_2} = e_2 \]
\[ e_3 = \]
\[ T : m \]

\[ T_2 \]

\[ 5 k \leq 0 \leq 3 k, k \geq 50 \]

\[ x = 0, \quad v = 0, \quad \frac{1}{2} I_1 \frac{d^2 x}{dt^2} \]

\[ R \]

\[ e_1 = s e_1 \]

\[ t_1 = f_2 \]

\[ e_2 = e_1 - e_3 \]

\[ t_2 = \frac{1}{I_2} f_2 \]

\[ \frac{d}{dx} p_2 = e_2 \]

\[ e_3 = \text{.} \]
\( I_1 = m \)
\( T_2 \)

\( 5 \frac{k}{x} - 1 \frac{k}{t} + 0 < 3 \frac{k}{l} + k' - 50 \)

\( v_0 = 0 \)
\( \frac{v}{w} = 0 \)
\( \sqrt{I} = 1 \)

\( x - v_0 \)

\( R \)

\( e_1 = \delta e_1 \)
\( t_1 = t_2 \)
\( e_2 = e_1 - e_3 \)
\( t_2 = \frac{1}{I_2} + p_2 \)
\( \frac{dp_2}{dt} = e_2 \)
\( e_3 = e_5 \)
\[ T_1 \]
\[ T_2 \]

\[ \Sigma T = 8 \]
\[ 1 \]
\[ 0 \leq x \leq 4 \]
\[ k' \leq 50 \]
\[ \Sigma F = 0 \]
\[ \Sigma M = 0 \]
\[ x = 0 \]
\[ v = 0 \]

\[ R \]
\[ x_1 - v_0 \]

\[ e_1 = e_1 \]
\[ t_1 = t_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{2} I_2 p_2 \]
\[ \frac{dp_2}{dt} = e_2 \]
\[ e_3 = e_5 \]
\[ t_3 = t_2 \]
\[ T_2 \]
\[ s^k \]
\[ e_1 = sE_1 \]
\[ t_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{T_2} \]
\[ dp_2 = e_2 \]
\[ e_3 = e_5 \]
\[ t_3 = t_2 \]
\[ e_4 = e_5 \]
\[ t_4 < t_5 \]
\[ T_2 \]

\[ s = 1, k = 0 < 3, 4, 5 \]

\[ v = 0 \]

\[ R' = (1 - v_0) \]

\[ e_1 = s \]

\[ t_1 = t_2 \]

\[ e_2 = e_1 - e_3 \]

\[ t_3 = \frac{1}{t_2} t_2 \]

\[ dp_2 \]

\[ e_3 = e_5 \]

\[ t_3 = t_2 \]

\[ e_4 = e_5 \]

\[ t_4 = t_5 \]
\[ R = \sqrt{1 - x^2} \]

\[ e_1 = \text{SE}_1 \]
\[ t_1 = \text{f}_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{t_2} \cdot p_2 \]
\[ \frac{dp_2}{dx} = e_2 \]
\[ e_3 = e_5 \]
\[ t_3 = \text{f}_2 \]
\[ e_4 = e_5 \]
\[ t_4 = \text{f}_8 \]
\[ e_5 = e_6 + e_7 \]
\[ f_5 = \]
\[ R = x_{21} - x_{2} \]

\[ E_1 = SE_1 \]
\[ t_1 = t_2 \]
\[ E_2 = E_1 - E_3 \]
\[ t_2 = \frac{1}{J_2} t_2 \]
\[ \frac{dp_2}{dt} = E_2 \]
\[ E_3 = E_5 \]
\[ t_3 = t_2 \]
\[ E_4 = E_5 \]
\[ t_4 = t_2 \]
\[ E_5 = E_6 + E_7 \]
\[ t_5 = t_3 - t_4 \]
\( \text{SE1} \)

\( t_1 = t_2 \)

\( e_2 = e_1 - e_3 \)

\( t_2 = \frac{1}{I_2} \cdot p_2 \)

\( \frac{dp_2}{dt} = e_2 \)

\( e_3 = e_5 \)

\( t_3 = t_2 \)

\( e_4 = e_5 \)

\( t_4 = t_2 \)

\( e_5 = e_6 + e_7 \)

\( t_5 = t_3 - t_4 \)
\[ F_k \Rightarrow 1 \Rightarrow C \Rightarrow 1 \Rightarrow \text{Se} \Rightarrow 1 \Rightarrow \text{Se} \]

\[ E_0 = \frac{v_0}{x} = \frac{1}{x} \frac{x}{v_0} \]

\[ \text{Equation} \]

\[ E_1 = \text{Se}_1 \]

\[ E_2 = E_1 - E_3 \]

\[ E_3 = E_5 \]

\[ E_4 = E_5 \]

\[ E_5 = E_6 + E_7 \]

\[ f_5 = f_3 - f_4 \]
\[ e_5 = e_6 + e_7 \]
\[ f_5 = f_3 - f_4 \]
\[ e_4 = e_5 \]
\[ f_4 = f_8 \]
\[ e_3 = e_5 \]
\[ f_3 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{T_2} f_2 \]
\[ d p_2 = e_2 \]
\[ e_1 = s e_1 \]
\[ f_1 = f_2 \]
\[ v_0 = 0 \]
\[ \nu = 0 \]
\[ \theta = \frac{\alpha}{2} \]
\[ \gamma_1 \]
\[ \gamma_2 \]
\[ e_1 = 5e_1 \]
\[ +_1 = +_2 \]
\[ e_2 = e_1 - e_3 \]
\[ +_2 = \frac{1}{I} +_2 \]
\[ \frac{dp_2}{dx} = e_2 \]
\[ e_3 = e_5 \]
\[ +_3 = +_2 \]
\[ e_4 = e_5 \]
\[ +_4 = +_8 \]
\[ e_5 = e_6 + c_7 \]
\[ +_5 = +_3 - +_4 \]
\[ E_1 = SE_1 \quad t_1 = t_2 \quad e_2 = e_1 - e_3 \quad t_2 = \frac{1}{k} p_2 \quad dp_2 = e_2 \]
\[ e_3 = e_5 \quad t_3 = t_2 \quad e_4 = e_5 \quad t_4 = t_3 \quad e_5 = e_6 + e_7 \quad t_5 = t_3 - t_4 \]
\[ e_1 = 5e_1 \]
\[ f_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{J_2} f_2 \]
\[ \frac{dp_2}{dt} = e_2 \]
\[ e_3 = e_5 \]
\[ f_3 = f_2 \]
\[ e_4 = e_5 \]
\[ f_4 = f_8 \]
\[ e_5 = e_6 + c_7 \]
\[ f_5 = f_3 - f_4 \]
\[ T^2 \]

\[ S = \begin{bmatrix} 1 & k^4 & 0 \end{bmatrix} \begin{bmatrix} k^3 \end{bmatrix} \begin{bmatrix} 5 \end{bmatrix} \]

\[ \begin{bmatrix} 1 \end{bmatrix} \begin{bmatrix} -v_0 \end{bmatrix} - \begin{bmatrix} 1 \end{bmatrix} \begin{bmatrix} t \end{bmatrix} = \begin{bmatrix} 0 \end{bmatrix} \]

\[ \begin{bmatrix} x \end{bmatrix} = \begin{bmatrix} 1 \end{bmatrix} \begin{bmatrix} x \end{bmatrix} - \begin{bmatrix} v_0 \end{bmatrix} \]

\[ R = \begin{bmatrix} e_1 = s e_1 \\
+1 = t_2 \\
+2 = e_2 \\
+3 = t_3 \\
+4 = t_4 \\
+5 = e_5 \\
+6 = t_6 \\
+7 = e_7 \\
+8 = e_8 \end{bmatrix} \]

\[ e_4 = e_3 \\
\frac{d p_2}{d t} = e_2 \\
\frac{d e_3}{d t} = e_4 \\
e_5 = e_6 + e_7 \\
f_5 = t_3 - t_4 \]
\[ R = \sqrt{x^2 + y^2} \]

\[ e_1 = 5e_1 \]
\[ t_1 = t_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{e_2} t_2 \]
\[ \frac{\partial p_2}{\partial t} = e_2 \]
\[ e_3 = e_5 \]
\[ t_3 = t_2 \]
\[ e_4 = e_5 \]
\[ t_4 = t_8 \]
\[ e_5 = e_6 + e_7 \]
\[ t_5 = t_3 - t_4 \]
\[ T = m \]

\[ T_2 \]

\[ \Sigma F_k = 0; \quad \Sigma M_k = 0 \]

\[ x = 0; \quad v = 0; \quad \dot{v} = \frac{x}{T} \]

\[ I_1 = 5; \quad I_2 = 3 \]

\[ e_1 = 5; \quad e_2 = 3 \]

\[ f_1 = f_2 \]

\[ e_3 = e_5 \]

\[ f_3 = f_2 \]

\[ e_4 = e_3 \]

\[ f_4 = f_3 \]

\[ e_5 = e_6 + e_7 \]
Individual Equation

\[ e_1 = e_1 \]
\[ t_1 = t_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{T_2} t_2 \]
\[ \sqrt{dp_2} = e_2 \]
\[ e_3 = e_3 \]
\[ t_3 = t_2 \]
\[ e_4 = e_4 \]
\[ t_4 = t_4 \]
\[ e_5 = e_6 + e_7 \]
Gaussby form

\[ T_1 = m \]
\[ T_2 \]

\[ SF = \frac{1}{2} k \varepsilon^2 \]

\[ E_0 = \varepsilon_0 \]
\[ \sigma = 0 \]

Individual Equations

\[ E_1 = SE_1 \]
\[ t_1 = t_2 \]
\[ E_2 = E_1 - E_3 \]
\[ t_2 = \frac{1}{2} t_2 \]
\[ \sqrt{dp_2} = E_2 \]

\[ E_3 = E_5 \]
\[ t_3 = t_2 \]
\[ E_6 = f_6 R_6 \]
\[ t_6 = f_5 \]
\[ E_7 = \frac{1}{2} \beta \gamma \]
\[ E_8 = e_4 \]
\[ f_8 = f_8 \]
\[f(t)\]

**Gauchy form**

\[T_1 = \text{const} \quad T_2 = \text{const}\]

\[\begin{align*}
S & = \frac{1}{2} k_1 \dot{y}^2 + \frac{1}{2} k_2 \dot{\theta}^2 + \frac{1}{2} k_3 \dot{\phi}^2 \\
\end{align*}\]

\[\begin{align*}
\dot{x}_0 & = 0 \\
\dot{\theta} & = \text{const} \\
\dot{\phi} & = \text{const} \\
\end{align*}\]

**Individual Equations**

\[\begin{align*}
E_1 &= \dot{E}_1 \\
E_2 &= E_1 - E_3 \\
E_3 &= E_5 \\
E_4 &= E_8 \\
E_6 &= f_6 R_6 \\
f_6 &= f_5 \\
e_7 &= \frac{1}{2} g_7 \\
f_7 &= f_5 \\
e_8 &= e_4 \\
f_8 &= s f_8 \\
\end{align*}\]
\[ \delta E = \frac{1}{2} k \left( x - x_0 \right)^2 \]

Gauchy form:

\[ \frac{dp_2}{dt} = e_2 - e_1 - e_3 = \delta \]

Individual Equations:

\[ E_1 = \delta E_1 \]
\[ t_1 = t_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{2} t_2 p_2 \]
\[ \sqrt{\frac{dp_2}{dt}} = e_2 \]

\[ E_3 = e_5 \]
\[ t_3 = t_2 \]
Cauchy form

\[ \frac{dv}{dt} = -e_2 - e_1 - e_3 = 5e \]

Individual Equations:

\[ e_1 = 5e \]
\[ f_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{I_2} f_2 \]
\[ \sqrt{\frac{dv}{dt}} = e_2 \]
\[ e_3 = e_5 \]
\[ f_3 = f_2 \]
\[ e_8 = e_4 \]
\[ f_8 = f_8 \]
Cauchy form

\[ T = m \]

\[ T_2 \]

\[ \frac{dp_2}{dx} = e_2 = e_1 - e_3 = SE_1 - SE_3 = \]

Individual Equations

\[ e_1 = SE_1 \]

\[ e_2 = e_1 - e_3 \]

\[ e_3 = e_5 \]

\[ e_4 = f_6 R_6 \]

\[ f_1 = f_2 \]

\[ f_2 = \frac{1}{T_2} f_2 \]

\[ \sqrt{\frac{dp_2}{dx}} = e_2 \]

\[ f_8 = e_4 \]

\[ f_7 = f_5 \]
\[ \frac{dp_2}{dt} = e_2 \]

\[
= \begin{align*}
E_1 &= sE_1 \\
E_2 &= E_1 - E_3 \\
F_2 &= \frac{1}{T_2} P_2 \\
E_3 &= E_5 \\
F_3 &= F_2 \\
e_4 &= e_5 \\
F_4 &= F_8 \\
e_5 &= e_6 + e_7 \\
F_5 &= F_3 - F_4
\end{align*}
\]
\[ \frac{dV}{dt} = \frac{dE}{dt} \]

**Individual Equations**

\[ E_1 = SE_1 \]
\[ f_4 = f_2 \]
\[ E_2 = E_1 - E_3 \]
\[ f_2 = \frac{1}{T_2} \]
\[ V_{dp2} = e_2 \]
\[ \frac{dV}{dt} = e_2 \]
\[ e_3 = e_5 \]
\[ f_3 = f_2 \]
\[ e_4 = e_5 \]
\[ f_4 = f_8 \]
\[ e_5 = e_6 + e_7 \]
\[ f_5 = f_3 - f_4 \]

\[ \frac{dV}{dt} = -e_1 - (e_6 + e_7) \]

\[ \frac{dV}{dt} = -e_1 - e_8 \]
\[ \begin{align*}
V &= 0 \\
\dot{V} &= 0 \\
\frac{d}{dt} = 5e1 - (e6 + e7)
\end{align*} \]

Individual Equations:

\[ \begin{align*}
e_1 &= \frac{1}{2}kx^2 \\
+1 &= f_2 \\
e_2 &= e_1 - e_3 \\
f_2 &= \frac{1}{T_2}\tau_2 \\
\sqrt{dp_2} &= e_2 \\
\frac{d}{dx} &= e_2 \\
e_3 &= e_5 \\
f_3 &= f_2 \\
e_4 &= e_5 \\
f_4 &= f_8 \\
e_5 &= e_6 + e_7 \\
f_5 &= f_3 - f_4
\end{align*} \]
\[ T_2 \]

\[
\frac{dR_2}{dt} = e_2 = e_1 - e_3 = \text{set } e_1 - e_3 =
\]

\[ e_0 \quad v_0 = 0 \quad v_0 = \quad \frac{1}{2} k x_0^2 \]

\[ e_0 \quad v_0 = 0 \quad v_0 = \quad \frac{1}{2} k x_0^2 \]

\[ \text{Individual Equations} \]

\[ \begin{align*}
E_1 &= \text{set } e_1 \\
+1 &= f_2 \\
e_2 &= e_1 - e_3 \\
t_2 &= \frac{1}{2} p_2 \\
\sqrt{\frac{dp_2}{dt}} &= e_2 \\
\end{align*} \]

\[ \begin{align*}
e_3 &= e_5 \\
+3 &= f_2 \\
e_4 &= e_5 \\
+4 &= f_8 \\
e_5 &= e_6 + e_7 \\
f_5 &= +3 - f_4 \\
\end{align*} \]
Individual Equation R

\[ E_1 = sE_1 \]
\[ t_1 = f_2 \]
\[ E_2 = E_1 - E_3 \]
\[ t_2 = \frac{1}{2} t_1 \]
\[ \sqrt{\frac{dp_2}{dx}} = E_2 \]

\[ t_3 = f_3 \]
\[ E_4 = E_5 \]
\[ t_4 = f_8 \]
\[ E_5 = E_6 + E_7 \]
\[ f_5 = t_3 - t_4 \]

\[ \frac{dp_2}{dx} = E_2 = E_1 - E_3 = sE_1 - E_5 = \]

\[ \frac{dE_7}{dt} = sE_1 - (E_6 + E_7) = \]
\[ T_2 = \frac{1}{2} k \frac{d^2 x}{dt^2} - e_0 + e_1 - e_3 = e_4 - e_5 = e_6 + e_7 = \]

\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = 5e_1 - e_5 =
\]

**Individual Equations**

- \( e_1 = 5e_1 \)
- \( e_2 = e_1 - e_3 \)
- \( e_3 = e_5 \)
- \( e_4 = e_5 \)
- \( e_5 = e_6 + e_7 \)
- \( e_6 = f_6 R_6 \)
- \( e_7 = \frac{1}{2} g_7 \)
- \( e_8 = e_4 \)
- \( f_3 = f_2 \)
- \( f_4 = f_8 \)
- \( f_5 = f_5 \)
- \( f_6 = f_6 \)

**Note:** The equations and terms are handwritten on the page, and not all symbols and variables are clearly visible due to the handwriting style and image resolution.
\[ \frac{dp_2}{dx} = e_2 = e_1 - e_3 = 5e_1 - e_5 = e_1 - (e_6 + e_7) = 5e_1 - f_6 - f_7 \]

Individual Equations:

- \( I_1 = 5e_1 \)
- \( f_2 = 1e_2 \)
- \( e_2 = e_1 - e_3 \)
- \( f_3 = f_2 \)
- \( e_4 = e_5 \)
- \( f_4 = f_8 \)
- \( e_5 = e_6 + e_7 \)
- \( f_6 = f_3 - f_4 \)
Individual Equations:

\[ E_1 = \pm E_1 \]
\[ f_1 = f_2 \]
\[ f_2 = \frac{1}{2} p_2 \]
\[ \sqrt{\frac{dp_2}{dt}} = e_2 \]

\[ E_3 = E_5 \]
\[ f_3 = f_2 \]
\[ f_4 = f_8 \]
\[ E_5 = E_6 + e_7 \]
\[ f_5 = f_3 - f_4 \]

\[ \frac{dp_2}{dt} = e_2 - e_1 - e_3 = \pm E_1 - E_5 = \]
\[ = \frac{5}{2} e_1 - (e_6 + e_7) = \pm E_1 - f_6 R_6 \]
\[ - \frac{1}{2} e_7 \]
\[ T_2 = 8 \, \frac{k^4}{c^3} \, \frac{1}{15} \, \frac{q^2}{v} \]

\[ dp_2 = e_2 = e_1 - e_3 = 5e_1 - e_5 = \frac{s_1}{1 - (e_6 + e_7)} = s_1 + f_6, R_6 \]

\[ \frac{dp_2}{dx} = e_2 = s_1 - \frac{1}{c_7} \]

**Individual Equation R**

- \( e_1 = s_1 \)
- \( f_1 = f_2 \)
- \( e_2 = e_1 - e_3 \)
- \( f_2 = \frac{1}{l_2} \, p_2 \)
- \( \sqrt{\frac{dp_2}{dx}} = e_2 \)
- \( e_3 = e_5 \)
- \( f_3 = f_2 \)
- \( e_4 = e_5 \)
- \( f_4 = f_8 \)
- \( e_5 = e_6 + e_7 \)
- \( f_5 = f_3 - f_4 \)

- \( e_6 = f_6, R_6 \)
- \( f_6 = f_5 \)
- \( e_7 = \frac{1}{c_7} \)
- \( f_7 = f_5 \)
- \( e_8 = e_4 \)
- \( f_8 = f_5 \)
\[ T_2 = k^\frac{8}{3} \left[ \frac{3}{8} - \frac{1}{8} \right] \]

\[ \frac{dp_2}{dx} = e_2 = e_1 - e_3 = SE_1 - e_5 = 5e_1 - f_6 = \]

\[ \frac{1}{c_7} \]

\[ f_6 = f_5 = \]

**Individual Equations**

\[ e_1 = SE_1 \]
\[ f_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{c_2}p_2 \]
\[ \sqrt{\frac{dp_2}{dx}} = e_2 \]
\[ e_3 = e_5 \]
\[ f_3 = f_2 \]
\[ e_4 = e_5 \]
\[ f_4 = f_8 \]
\[ e_5 = e_6 + c_7 \]
\[ f_5 = f_3 - f_4 \]

\[ e_6 = f_6 R_6 \]
\[ f_6 = f_5 \]
\[ e_7 = \frac{1}{c_7} \]
\[ f_7 = f_5 \]
\[ e_8 = e_4 \]
\[ f_8 = f_8 \]
\[ T_2 = \frac{1}{2} k \Delta x^2 + 0 \leq 3 \frac{1}{2} k \Delta x^2 + 0 \leq 5 \frac{1}{2} k \Delta x^2 + 0 \leq 1 \frac{1}{2} k \Delta x^2 + 0 \leq x \]

\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = 5e_1 - e_5 = \]

\[ \frac{e_6}{e_7} = 5e_1 - (e_6 + e_7) = 5e_1 - f_6 e_8 \]

\[ \frac{f_6}{e_7} = f_5 = f_3 - f_4 \]

Individual Equations:

- \( e_1 = 5e_1 \)
- \( t_1 = f_2 \)
- \( e_2 = e_1 - e_3 \)
- \( t_2 = \frac{1}{2} f_2 \)
- \( \sqrt{\frac{dp_2}{dt}} = e_2 \)

- \( e_3 = e_5 \)
- \( t_3 = f_2 \)
- \( e_4 = e_5 \)
- \( t_4 = f_8 \)
- \( e_5 = e_6 + e_7 \)
- \( t_5 = f_3 - f_4 \)

- \( e_6 = f_5 \)
- \( e_7 = \frac{1}{2} f_7 \)
- \( e_8 = e_4 \)
- \( f_8 = f_4 \)
\[ T_2 \]

\[ \frac{dp_2}{dt} = e_2 - e_3 = \text{SE}_1 - e_5 = \frac{1}{c_7} \]

Individual Equations:

\[ e_1 = \text{SE}_1 \]
\[ e_2 = e_1 - e_3 \]
\[ e_3 = e_5 \]
\[ e_4 = e_5 \]
\[ e_5 = e_6 + c_7 \]
\[ e_6 = f_5 \]
\[ e_7 = \frac{f_6}{c_7} \]
\[ e_8 = e_4 \]
\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 \]
Individual Equations

\[ E_1 = \varepsilon E_1 \]
\[ f_1 = f_2 \]
\[ E_2 = E_1 - e_3 \]
\[ f_2 = \frac{1}{I_2} f_2 \]
\[ \sqrt{\frac{dE_2}{dt}} = e_2 \]

\[ e_3 = e_5 \]
\[ f_3 = f_2 \]
\[ e_4 = e_5 \]
\[ f_4 = f_8 \]
\[ e_5 = e_6 + e_7 \]
\[ f_5 = f_3 - f_4 \]

\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = \varepsilon E_1 - e_5 = \]
\[ = \varepsilon E_1 - (e_6 + e_7) = \varepsilon E_1 - f_6 \theta \]
\[ - \frac{1}{C_7} f_7 \]

\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 = \]
\[ = \frac{1}{I_2} \frac{p_2}{2} - \varepsilon \Phi B \]
$T_2$

$\frac{dp_2}{dt} = e_2 = e_1 - e_3 = \text{se}_1 - e_5 = 0$

$\frac{v}{w} = 0$

$\sqrt{\frac{dp_2}{dt}} = e_2$

$\sqrt{\frac{d\theta_7}{dt}} = f_5$

Individual Equations

$e_1 = \text{se}_1$

$t_1 = f_2$

$e_2 = e_1 - e_3$

$t_2 = \frac{1}{T_2} p_2$

$e_3 = e_5$

$t_3 = f_2$

$e_4 = e_5$

$t_4 = f_8$

$e_5 = e_6 + c_7$

$f_5 = t_3 - t_4$

$t_6 = t_5 = t_3 - t_4 = t_2 - f_8$

$\frac{1}{I_2} p_2 - 5f_8$

$f_6 = f_5 = f_3 - f_4 = t_2 - f_8$

$e_8 = e_4$

$t_8 = f_8$
T_2

\[ \frac{dp_2}{dx} = e_2 = e_1 - e_3 = se_1 - e_5 = se_1 - e_6 \]

\[ \frac{d^2p_2}{dx^2} = e_2 = \frac{1}{c_7} (e_6 + e_7) = se_1 - f_6 \]

\[ f_6 = f_7 = f_3 - f_5 = t_2 - f_8 \]

\[ f_8 = \frac{1}{I_2} p_2 - 5RF \]

**Individual Equations**

- \( e_1 = se_1 \)
- \( t_1 = f_2 \)
- \( e_2 = e_1 - e_3 \)
- \( t_2 = \frac{1}{I_2} p_2 \)
- \( \sqrt{\frac{dp_2}{dx}} = e_2 \)
- \( e_3 = e_5 \)
- \( t_3 = f_2 \)
- \( e_4 = e_5 \)
- \( t_4 = f_8 \)
- \( e_5 = e_6 + e_7 \)
- \( f_5 = t_3 - f_4 \)
Individual Equation R

\[ E_1 = S_1 - e_1 \]
\[ t_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{\frac{dp_2}{dt}} = e_2 \]

\[ E_3 = e_5 \]
\[ t_3 = f_2 \]
\[ e_4 = e_5 \]
\[ t_4 = f_8 \]
\[ e_5 = e_6 + e_7 \]
\[ t_5 = f_3 - f_4 \]

\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = S_1 - e_5 = \]
\[ \frac{dE_1}{dt} = S_1 - (\frac{1}{I_2} p_2 - S_1) \]
Individual Equations:

\[
\begin{align*}
E_1 &= sE_1 \\
+1 &= f_2 \\
\varepsilon_2 &= E_1 - E_3 \\
f_2 &= \frac{1}{T_2} p_2 \\
\sqrt{\frac{dp_2}{dt}} &= \varepsilon_2 \\
\end{align*}
\]

\[
\begin{align*}
E_3 &= E_5 \\
+3 &= f_2 \\
e_4 &= e_5 \\
+4 &= f_8 \\
e_5 &= e_6 + e_7 \\
f_5 &= f_3 - f_4 = f_2 - f_8 \\
&= \frac{1}{T_2} P_2 - sE_8
\end{align*}
\]
Indirect Engine Equations

\[ E_1 = SE_1 \]
\[ T_1 = \frac{SE_1}{C_1} \]
\[ T_2 = \frac{SE_1}{C_2} \]
\[ T_2 = \frac{SE_1}{C_3} \]

\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = SE_1 - e_5 = \]
\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = SE_1 - e_5 = \]
\[ \frac{df_6}{dt} = f_6 = f_5 + f_7 = e_6 - e_8 = \]
\[ f_6 = f_5 + f_7 = e_6 - e_8 = \]
\[ \frac{df_7}{dt} = f_7 = f_5 = \]
\[ f_7 = f_5 = \]

\[ \frac{df_8}{dt} = f_8 = e_4 = \]
\[ f_8 = e_4 = \]

\[ f_8 = e_4 = \]

\[ f_8 = e_4 = \]
T_2
\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = \varepsilon E_1 - E_3 = \]
\[ = \varepsilon_0 E_0 + \frac{1}{c^2} \frac{dE_2}{dt} c - \frac{1}{c_7} \frac{dE_7}{dt} c = \]
\[ = \varepsilon_0 E_0 + \frac{1}{c^2} \frac{dE_2}{dt} c - \frac{1}{c_7} f_7 = \]
\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 = \]
\[ = \frac{1}{I_2} p_2 - \varepsilon E B \]

Individual Equation R
\[ E_1 = \varepsilon E_1 \]
\[ +t = f_2 \]
\[ +e = e_1 - e_3 \]
\[ +2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{\frac{dp_2}{dt}} = e_2 \]
\[ e_3 = e_5 \]
\[ +3 = f_2 \]
\[ +4 = e_5 \]
\[ +4 = f_8 \]
\[ +5 = e_6 + c_7 \]
\[ +3 = f_3 - f_4 \]
Individual Equations

$E_1 = SE_1$
$E_2 = E_1 - E_3$
$E_3 = E_5$
$E_4 = E_6$
$E_5 = E_6 + E_7$
$E_6 = E_7$
$E_7 = \frac{1}{C_7}$
$E_8 = E_4$
$f_3 = f_2$
$f_4 = f_8$
$f_5 = f_3$
$f_6 = f_5 - f_4 - f_3 - f_8$
$f_7 = f_5$
$f_8 = f_7$

$\frac{dp_2}{dx} = e_2$
$\frac{dp_2}{dx} = e_1 - e_3 = SE_1 - E_5$

$\frac{dp_2}{dx} = e_2 - e_1 - e_2 = SE_1 - E_5$
$\frac{dp_2}{dx} = SE_1 - (SE_1 + E_6 + E_7) = SE_1 - f_6 R_6$
$\frac{dp_2}{dx} = SE_1 - (\frac{1}{I_2} P_2 - SE_8) R_6 - \frac{1}{C_7}$
\[ \frac{dp_2}{dx} = e_2 = e_1 - e_3 = SE_1 - e_5 = \]

\[ e_3 = e_5 \]

\[ \frac{d\alpha_1}{dx} = f_5 \]

\[ \alpha_1 = f_3 \]

\[ e_4 = f_2 \]

\[ e_8 = e_4 \]

\[ f_8 = f_4 \]

\[ e_5 = e_6 + e_7 \]

\[ f_5 = f_3 - f_4 \]

\[ +1 = f_2 \]

\[ e_2 = e_1 - e_3 \]

\[ f_2 = \frac{1}{T_2} \alpha_2 \]

\[ \sqrt{\frac{dp_2}{dx}} = e_2 \]

\[ \sqrt{\frac{dp_2}{dx}} = e_2 \]

\[ \frac{dp_2}{dx} = e_2 \]

\[ \frac{d\alpha_1}{dx} = f_5 \]

\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 \]

\[ +6 = f_5 = f_3 - f_4 = f_2 - f_8 \]

\[ \frac{1}{I_2} \alpha_2 - SE \]

\[ E_1 = SE_1 \]

\[ +2 = f_2 \]

\[ e_2 = e_1 - e_3 \]
\[
\begin{align*}
\frac{dp_2}{dt} &= e_2 = e_1 - e_3 = sE_1 - e_5 \\
\frac{dE_1}{dt} &= sE_1 - (e_6 + e_7) = sE_1 - f_6 P_2 + \frac{1}{2} \frac{dR_2}{dt}
\end{align*}
\]
Individual Equations

\[ E_1 = \delta E_1 \]
\[ E_2 = E_1 - E_3 \]
\[ f_2 = \frac{1}{I_2} \cdot p_2 \]
\[ \frac{dp_2}{dt} = e_2 \]
\[ E_3 = E_5 \]
\[ f_3 = f_2 \]
\[ E_4 = E_5 \]
\[ f_4 = f_8 \]
\[ E_5 = E_6 + E_7 \]
\[ f_5 = f_3 - f_4 \]

\[ E_6 = f_5 \]
\[ E_7 = \frac{1}{C_7} \]
\[ f_7 = f_5 \]
\[ E_8 = E_4 \]
\[ f_8 = f_5 \]

\[ f_6 = f_6 - f_8 \]
\[ f_6 = f_5 - f_4 \]
\[ f_6 = f_5 - f_4 \]
\[ f_6 = f_5 - f_4 \]

\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = \delta E_1 - E_5 = \]
\[ \frac{dE_1}{dt} = \delta E_1 - (E_6 + E_7) \]
\[ - \frac{1}{C_7} \]

\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 \]
\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 \]

\[ \frac{1}{I_2} p_2 = \delta E_1 \]
\[ T_2 = 8 \frac{k}{k_1} \frac{1}{C_3} \frac{4}{4} \frac{1}{C_5} \frac{1}{C_6} \]

\[ E_0 \]

\[ \frac{1}{v_0} = \frac{1}{v} \]

\[ T_2 = \frac{d}{dE} E_2 = E_2 - E_3 = SE_1 - E_5 = \]

\[ \frac{dE_2}{dt} = SE_1 - (E_6 + E_7) = SE_1 - \frac{SE_1}{C_7} - \frac{1}{C_7} \]

\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 = \]

\[ = \frac{1}{I_2} P_2 - SE_1 B \]

Individual Equations:

\[ E_1 = SE_1 \]

\[ t_1 = f_2 \]

\[ e_2 = E_1 - E_3 \]

\[ t_2 = \frac{1}{I_2} p_2 \]

\[ \sqrt{dE_2} = E_2 \]

\[ e_3 = E_5 \]

\[ t_3 = f_2 \]

\[ e_4 = E_4 \]

\[ t_4 = f_8 \]

\[ e_5 = E_6 + E_7 \]

\[ f_5 = t_3 - f_4 \]
Individual Equation R

\[ E_1 = \text{SE}_1 \]
\[ t_1 = t_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]

\[ \sqrt{\frac{\text{d}p_2}{\text{d}t}} = e_2 \]

\[ e_3 = e_5 \]
\[ t_3 = t_2 \]
\[ e_4 = e_5 \]
\[ t_4 = t_5 \]
\[ e_5 = e_6 + c_7 \]
\[ t_5 = t_3 - t_4 \]

\[ \frac{\text{d}e_2}{\text{d}t} = e_2 - e_3 = \text{SE}_1 - e_5 = \frac{1}{c_7} \]
\[ \frac{\text{d}e_6}{\text{d}t} = \text{SE}_1 - (\frac{1}{I_2} p_2 - \text{SE}_8) R_6 - \frac{1}{c_7} \]

\[ f_6 = f_5 = f_3 - f_4 = t_2 - t_8 \]
\[ t_6 = t_5 \]
\[ e_8 = e_4 \]
\[ f_8 = f_5 \]

\[ f_6 = \frac{1}{I_2} (p_2 - \text{SE}_8) R_6 - \frac{1}{c_7} \]
Individual Equation R

\[ E_1 = SE_1 \]
\[ t_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{\frac{dp_2}{dt}} = e_2 \]

\[ E_3 = e_5 \]
\[ t_3 = f_2 \]
\[ e_4 = e_5 \]
\[ t_4 = f_8 \]
\[ e_5 = e_6 + c_7 \]
\[ f_5 = t_3 - f_4 \]

\[ \frac{dp_2}{dt} = e_2 \]
\[ E_6 = f_6 r_6 \]
\[ t_6 = f_5 \]
\[ e_7 = \frac{1}{c_7} \]
\[ f_7 = f_5 \]

\[ f_8 = E_4 \]
\[ t_8 = f_5 \]

\[ t_9 = f_6 \]
\[ E_9 = f_8 \]

\[ t_{10} = f_5 \]
\[ E_{10} = f_8 \]
Individual Equation \( R \)

\[
\begin{align*}
E_1 &= SE_1 \\
+1 &= f_2 \\
e_2 &= e_1 - e_3 \\
t_2 &= \frac{1}{I_2} p_2 \\
\sqrt{\frac{dp_2}{dt}} &= e_2 \\
e_3 &= e_5 \\
+3 &= f_2 \\
e_4 &= e_5 \\
t_4 &= f_8 \\
e_5 &= e_6 + e_7 \\
f_5 &= t_3 - t_4 \\
\end{align*}
\]

\[
\begin{align*}
E_6 &= f_6 R_6 \\
t_6 &= f_5 \\
e_7 &= \frac{1}{C_7} \\
f_7 &= f_5 \\
e_8 &= e_4 \\
f_8 &= f_5 \\
e_9 &= e_8 \\
f_9 &= t_3 - t_4 \\
\end{align*}
\]

\[
\begin{align*}
\frac{dp_2}{dt} &= e_2 - e_3 = SE_1 - e_5 = \\
\frac{dv}{w_0} &= \frac{1}{C_7} \\
f_6 &= f_5 = f_3 - f_4 = t_2 - f_8 \\
&= \frac{1}{I_2} p_2 - SE B \\
&= SE_1 - \left( \frac{1}{I_2} B_2 - SE B \right) R_6 - \frac{1}{C_7} \\
&= SE_1 - \frac{B_2}{I_2} P_2 - R_6 SE B - \frac{1}{C_7}
\end{align*}
\]
\[
\frac{dp_2}{dt} = e_2 = e_1 - e_3 = SE_1 - e_3 = e_1 - e_3 - SE_1 - f_6 = SE_1 - (e_6 + e_7) = SE_1 - f_6 R_6 - \frac{1}{C_7} f_7
\]

\[
f_6 = f_5 = f_3 - f_4 = f_2 - f_8 = \frac{1}{I_2} P_2 - SE B
\]

**Individual Equations**

\[
e_1 = SE_1
\]

\[
t_1 = t_2
\]

\[
e_2 = e_1 - e_3
\]

\[
t_2 = \frac{1}{I_2} t_2
\]

\[
e_3 = e_5
\]

\[
t_3 = t_2
\]

\[
e_4 = e_5
\]

\[
t_4 = t_8
\]

\[
e_5 = e_6 + e_7
\]

\[
t_5 = t_3 - t_4
\]

\[
e_6 = e_4
\]

\[
t_6 = t_8
\]

\[
e_7 = \frac{1}{C_7} f_7
\]

\[
e_8 = e_4
\]

\[
t_8 = SE_8
\]
Individual Equations

\[ E_1 = \text{SE}_1 \]
\[ E_2 = e_1 - e_3 \]
\[ E_3 = e_5 \]
\[ E_4 = e_6 + e_7 \]
\[ E_5 = e_6 + e_7 \]

\[ f_1 = f_2 \]
\[ f_2 = \frac{1}{I_2} p_2 \]
\[ f_3 = f_2 \]
\[ f_4 = f_6 \]
\[ f_5 = f_6 \]

\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 \]
\[ f_7 = f_5 \]
\[ f_8 = f_6 \]

\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = \text{SE}_1 - e_5 = \]
\[ \frac{de_7}{dt} = \frac{1}{C_7} \]

\[ -\frac{1}{C_7} \]

\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = \text{SE}_1 - e_5 = \]
\[ \frac{de_7}{dt} = \frac{1}{C_7} \]

\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = \text{SE}_1 - e_5 = \]

\[ \frac{de_7}{dt} = \frac{1}{C_7} \]
Individual Equations

$E_1 = SE_1$
$E_2 = f_2$
$E_3 = E_1 - E_3$
$E_4 = E_3$
$E_5 = E_4$
$f_3 = f_2$
$f_4 = f_2$

$\frac{dv_2}{dt} = E_2$
$\frac{dv_0}{dt} = 0$

$\frac{dp_2}{dt} = E_2 - E_3 = SE_1 - E_5 = SE_1 - (E_6 + E_7) = SE_1 - f_6 P_2$

$E_7 = \frac{1}{C_7}$
$f_7 = f_5$
$\frac{dv_7}{dt} = E_7 = \frac{1}{C_7}$
$f_8 = f_7$
$E_8 = f_8$

$\frac{dp_2}{dt} = E_2 - f_2 = SE_1 - \left( \frac{1}{I_2} P_2 - SE_8 \right) R_6 - \frac{1}{C_7}$

$\frac{dp_2}{dt} = SE_1 - \frac{R_2}{I_2} P_2 - R_6 SE_8 - \frac{1}{C_7}$
Individual Equation

$E_1 = 5E_1$

$E_2 = e_1 - e_3$

$t_2 = \frac{1}{I_2} p_2$

$\sqrt{\frac{dp_2}{dt}} = e_2$

$E_3 = e_5$

$f_3 = f_2$

$E_4 = e_5$

$t_4 = f_2$

$E_5 = e_6 + c_7$

$f_5 = f_3 - f_4$

$E_6 = e_7$

$c_7 = \frac{1}{I_2} p_2$

$E_7 = \frac{1}{I_2} p_2$

$E_8 = e_4$

$f_8 = f_5$

$\frac{dp_2}{dt} = e_2 = e_1 - e_3 = 5E_1 - e_5 = \frac{dE_1}{dt} = \frac{5E_1 - (\frac{1}{I_2} p_2 - 5E_8) R_6 - \frac{1}{c_7} g_7}{I_2}$

$\frac{dE_7}{dt} = \frac{f_5}{c_7} = f_6 = \frac{1}{I_2} p_2 - 5E_8 - \frac{1}{c_7} g_7$
Individual Equations

\[ E_1 = SE_1 \]
\[ \frac{dp_2}{dt} = e_2 = e_1 - e_3 = SE_1 - e_5 = \]
\[ \frac{e_7}{c_7} = \frac{1}{I_2} \]
\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 \]
\[ f_8 = SE_8 \]

\[ \frac{d\theta}{dt} = f_5 = f_6 = \frac{1}{I_2} \]

\[ \frac{d\varphi}{dt} = f_5 = f_6 = \frac{1}{I_2} \]

\[ \frac{d\beta}{dt} = SE_1 - \frac{R_2}{I_2} P_2 - R_6 SE_8 - \frac{1}{c_7} \]

\[ \frac{d\gamma}{dt} = \frac{f_5}{c_7} = f_6 = \frac{1}{I_2} P_2 - SE_8 \]
Individual Equation R

\[ E_1 = \sigma E_1 \]
\[ t_1 = f_2 \]
\[ E_2 = E_1 - E_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{\frac{dp_2}{dt}} = e_2 \]
\[ E_3 = e_5 \]
\[ t_3 = f_2 \]
\[ E_4 = e_5 \]
\[ t_4 = f_8 \]
\[ E_5 = e_6 + c_7 \]
\[ f_5 = t_3 - f_4 \]

\[ \frac{dp_2}{dt} = e_2 = E_1 - E_3 = SE_1 - e_5 = \]
\[ \frac{dp_2}{dt} = e_5 = \frac{1}{I_2} p_2 - R_6 \sigma E_8 - \frac{1}{C_7} \]

\[ f_6 = f_5 = f_3 - f_4 = t_2 - f_8 \]
\[ \frac{1}{I_2} p_2 - \sigma E_8 \]

\[ t_6 = f_2 \]
\[ E_7 = \frac{1}{C_7} \]
\[ f_7 = t_5 \]
\[ E_8 = e_4 \]
\[ f_8 = \sigma E_8 \]

\[ \frac{dp_2}{dt} = \frac{1}{I_2} p_2 - R_6 \sigma E_8 - \frac{1}{C_7} \]
\[ \frac{dp_2}{dt} = \frac{1}{I_2} p_2 - R_6 \sigma E_8 - \frac{1}{C_7} \]
Individual Equations

\[ E_1 = sE_1 \]
\[ t_1 = f_2 \]
\[ E_2 = E_1 - E_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{\frac{dp_2}{dt}} = E_2 \]
\[ E_3 = E_5 \]
\[ t_3 = f_2 \]
\[ E_4 = E_5 \]
\[ t_4 = f_8 \]
\[ E_5 = e_6 + e_7 \]
\[ f_5 = t_3 - f_4 \]
\[ T_2 = 8 \frac{k^4}{c^3} \]

\[ e_0 = \frac{v}{w} = 5 \]

\[ df_2 = e_2 = e_1 - e_3 = SE_1 - e_5 = \]
\[ \frac{dR_2}{dx} = SE_1 - (e_6 + e_7) = SE_1 - f_6. \]
\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 \]
\[ \frac{1}{c_7} \]
\[ f_8 = SE_8 \]

**Individual Equations:**

\[ E_1 = SE_1 \]
\[ f_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{T_2} f_2 \]
\[ e_3 = e_5 \]
\[ f_3 = f_2 \]
\[ e_4 = e_5 \]
\[ f_4 = f_8 \]
\[ e_5 = e_6 + e_7 \]
\[ f_5 = f_3 - f_4 \]

\[ \frac{dR_2}{dx} = SE_1 - \frac{B_2}{T_2} + R_6.SE_8 - \frac{1}{c_7} \]

\[ dR_2 = SE_1 - \frac{B_2}{T_2} - R_6.SE_8 - \frac{1}{c_7} \]

\[ \frac{dR_2}{dx} = \frac{1}{T_2} P_2 - SE_8 \]

\[ \frac{df_2}{dx} = f_5 = f_6 = \frac{1}{T_2} P_2 - SE_8 \]

\[ \frac{df_2}{dx} = \frac{1}{T_2} P_2 - SE_8 \]
Individual Equations:

\[ E_1 = 5E_1 \]
\[ t_1 = f_2 \]
\[ E_2 = E_1 - E_3 \]
\[ t_2 = \frac{1}{I_2} \rho_2 \]

\[ \sqrt{dp_2} = e_2 \]
\[ e_3 = e_5 \]
\[ t_3 = t_2 \]
\[ e_4 = e_5 \]
\[ t_4 = f_8 \]

\[ E_5 = E_6 + e_7 \]
\[ t_5 = t_3 - t_4 \]

Steady State Form:

\[ \begin{bmatrix} \frac{d\rho_2}{dt} \\ \frac{df_5}{dt} \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \]
Individual Equations

\[ E_1 = E_1 \]
\[ t_1 = t_2 \]
\[ E_2 = E_1 - E_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{d p_2} = e_2 \]

\[ E_3 = E_5 \]
\[ t_3 = t_2 \]
\[ E_4 = E_5 \]
\[ t_4 = t_5 \]
\[ E_5 = E_6 + E_7 \]
\[ t_5 = t_3 - t_4 \]

\[ E_6 = f_6 R_6 \]
\[ t_6 = t_5 \]
\[ E_7 = \frac{1}{I_2} C_7 \]
\[ f_7 = f_5 \]
\[ d E_7 = f_5 \]
\[ \frac{d E_7}{dt} = \frac{1}{I_2} \frac{d p_2}{dt} - \frac{5}{C_7} \]

\[ \frac{d p_2}{dt} = E_1 - \frac{5}{C_7} p_2 - R_6 \frac{5}{C_7} \]

\[ \frac{d p_2}{dt} = \frac{1}{I_2} p_2 - 5 \frac{C_7}{C_7} \]

\[ \frac{d q_7}{dt} = \frac{1}{I_2} p_2 - 5 \frac{C_7}{C_7} \]

Matrix Form:

\[ \begin{bmatrix} \frac{d p_2}{dt} \\ \frac{d q_7}{dt} \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \end{bmatrix} \begin{bmatrix} p_2 \\ q_7 \end{bmatrix} \]
Individual Equations

\[ E_1 = S_1 \]
\[ t_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{d p_2} = e_2 \]

\[ E_6 = f_6 R_6 \]
\[ t_6 = f_5 \]
\[ e_6 = e_5 \]
\[ t_3 = f_2 \]
\[ e_4 = e_3 \]
\[ t_4 = f_8 \]
\[ e_5 = e_6 + e_7 \]
\[ f_5 = t_3 - t_4 \]

\[ \frac{d p_2}{d t} = \frac{1}{I_2} p_2 - S F \]
\[ \frac{d e_7}{d t} = f_5 \]
\[ \frac{d e_8}{d t} = e_4 \]
\[ \frac{d e_9}{d t} = f_6 = \frac{1}{I_2} p_2 - S F \]

\[ \frac{d g_7}{d t} = \frac{1}{I_2} p_2 - S F \]

Stat Space Form

\[ \begin{bmatrix} \frac{d p_2}{d t} \\ \frac{d e_7}{d t} \\ \frac{d e_8}{d t} \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \begin{bmatrix} -S F \\ -S F \end{bmatrix} \begin{bmatrix} p_2 \\ g_7 \\ e_8 \end{bmatrix} \]
Individual Equation R

\[ E_1 = SE_1 \]
\[ t_1 = f_2 \]
\[ E_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{dp_2} = e_2 \]

\[ E_6 = f_6 R_b \]
\[ +6 = f_5 \]
\[ E_7 = \frac{1}{C_7} \]
\[ t_7 = f_7 \]
\[ \frac{dp_7}{dt} = f_7 \]
\[ e_8 = e_4 \]
\[ t_8 = f_8 \]
\[ E_5 = E_6 + C_7 \]
\[ t_5 = t_3 - t_4 \]

\[ \frac{d(p_2)}{dt} = \frac{1}{I_2} p_2 \]
\[ \frac{d(p_2)}{dt} = \frac{1}{I_2} p_2 - p_6 - SE_8 - \frac{1}{C_7} \]

\[ \frac{d(p_2)}{dt} = f_5 = f_6 = \frac{1}{I_2} p_2 - SE_8 \]

\[ \frac{d(p_2)}{dt} = \frac{1}{I_2} p_2 - p_6 - SE_8 - \frac{1}{C_7} \]

\[ \frac{d(p_2)}{dt} = \frac{1}{I_2} p_2 - p_6 - SE_8 \]
Individual Equation \( R \)

\[
E_1 = \Phi E_1 \\
E_2 = E_1 - E_3 \\
E_3 = E_5 \\
E_4 = E_5 \\
E_5 = E_6 + E_7 \\
E_6 = f_6 R_6 \\
E_7 = \frac{1}{L_2} C_7 \\
E_8 = E_4 \\
f_5 = f_6 = \frac{1}{L_2} R_6 \\
f_6 = f_5 = f_7 = \frac{1}{C_7} \\
\frac{dE_2}{dt} = f_5 \\
\frac{dE_7}{dt} = f_5 = \frac{1}{L_2} R_6 \\
\frac{dE_8}{dt} = f_5 = \frac{1}{C_7} \\
dp_2 = \Phi E_1 - \frac{B_2}{L_2} R_6 \Phi E_1 - \frac{1}{C_7} \Phi E_1
\]

\[
\begin{bmatrix}
\frac{dp_2}{dt} \\
\frac{dE_7}{dt}
\end{bmatrix} = 
\begin{bmatrix}
\frac{-B_2}{L_2} \\
\frac{-1}{C_7}
\end{bmatrix}
\begin{bmatrix}
P_2 \\
E_7
\end{bmatrix} + 
\begin{bmatrix}
\frac{1}{L_2} \\
\frac{1}{C_7}
\end{bmatrix}
\begin{bmatrix}
\Phi E_1 \\
\Phi E_1
\end{bmatrix}
\]

Steady State Form
Individual Equations:

\[ E_1 = SE_1 \]
\[ t_1 = f_2 \]
\[ E_2 = E_1 - E_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{d_p_2} = e_2 \]
\[ E_3 = E_5 \]
\[ t_3 = f_2 \]
\[ E_4 = E_5 \]
\[ t_4 = f_8 \]
\[ E_5 = E_6 + E_7 \]
\[ f_5 = t_3 - t_4 \]

\[ E_6 = f_6 R_6 \]
\[ t_6 = f_5 \]
\[ E_7 = \frac{1}{C_7} \]
\[ f_7 = f_5 \]
\[ \frac{dp_2}{dt} = e_2 \]
\[ e_8 = e_4 \]
\[ f_8 = SE_8 \]

\[ \frac{dg_7}{dt} = \frac{1}{I_2} P_2 - SE_7 \]

State Space Form:

\[ \begin{bmatrix} \frac{dp_2}{dt} \\ \frac{dg_7}{dt} \end{bmatrix} = \begin{bmatrix} -\frac{P_2}{I_2} & -\frac{1}{C_7} \\ \frac{1}{I_2} & 0 \end{bmatrix} \begin{bmatrix} P_2 \\ g_7 \end{bmatrix} + \begin{bmatrix} 0 \\ \frac{SE_7}{C_7} \end{bmatrix} \]
Individual Equations:

\[ \begin{align*}
\theta_1 &= \phi_1 \\
\theta_2 &= \phi_1 - \phi_3 \\
\theta_3 &= f_2 \\
\phi_1 &= e_1 - e_3 \\
\phi_2 &= \frac{1}{I_2} \phi_2 \\
\phi_3 &= f_4 \\
e_4 &= \phi_5 \\
\phi_4 &= f_5 \\
e_5 &= e_6 + e_7 \\
e_6 &= f_7 \\
f_5 &= f_3 - f_4 \\
\frac{dt}{dx} &= \phi_2 \\
\frac{d\phi_2}{dt} &= f_2 \\
\frac{d\phi_3}{dt} &= f_5 = f_6 = \frac{1}{I_2} \phi_2 - S \phi_8 \\
\frac{d\phi_4}{dt} &= f_8 = S \phi_8 \\
\frac{d\phi_5}{dt} &= f_7 \\
\frac{d\phi_6}{dt} &= e_5 \\
\phi_7 &= \frac{1}{C_1} \phi_7 \\
\frac{d\phi_8}{dt} &= f_9 = \frac{1}{C_1} \phi_8 \\
\phi_9 &= \frac{1}{C_1} \phi_9 \\
R &= \frac{1}{I_2} \phi_2 - S \phi_8 \\
\end{align*} \]
Individual Equation R

\[ E_1 = sE_1 \]
\[ t_1 = f_2 \]
\[ E_2 = E_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{dE_2} = e_2 \]

\[ \frac{dE_3}{dt} = e_5 \]
\[ t_3 = f_2 \]
\[ E_4 = e_5 \]
\[ t_4 = f_6 \]
\[ E_5 = E_6 + e_7 \]
\[ t_5 = f_3 - f_4 \]

\[ E_6 = f_6 R_6 \]
\[ t_6 = f_5 \]
\[ E_7 = \frac{1}{c_7} E_7 \]
\[ t_7 = f_5 \]
\[ \frac{dE_7}{dt} = f_5 = f_6 = \frac{1}{I_2} p_2 - \frac{1}{c_7} \]

\[ dE_7 \]

\[ \frac{dE_8}{dt} = f_5 = f_6 = \frac{1}{I_2} p_2 - \frac{1}{c_7} \]

\[ \frac{dE_9}{dt} = \frac{1}{I_2} p_2 - \frac{1}{c_7} \]

\[ \frac{dE_{10}}{dt} = \frac{1}{I_2} p_2 - \frac{1}{c_7} \]

\[ \frac{dE_{11}}{dt} = \frac{1}{I_2} p_2 - \frac{1}{c_7} \]

Steady State Form

\[ \begin{bmatrix} \frac{dP_2}{dt} \\ \frac{dE_5}{dt} \end{bmatrix} = \begin{bmatrix} \frac{1}{I_2} - \frac{1}{c_7} & 0 \\ 0 & \frac{1}{I_2} \end{bmatrix} \begin{bmatrix} P_2 \\ E_5 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} \frac{3E_5}{I_2} \]
Individual Equations

\[ E_1 = \text{SE}_1 \]
\[ t_1 = f_2 \]
\[ E_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{T_2} \cdot p_2 \]
\[ \sqrt{dp_2} = e_2 \]
\[ E_3 = e_5 \]
\[ t_3 = f_2 \]
\[ E_4 = e_5 \]
\[ t_4 = f_5 \]
\[ E_5 = e_6 + e_7 \]
\[ t_5 = f_3 - t_4 \]

\[ E_6 = f_6 \cdot R_6 \]
\[ f_6 = f_5 \]
\[ E_7 = \frac{1}{R_7} \cdot e_7 \]
\[ f_7 = f_5 \]
\[ E_8 = e_4 \]
\[ f_8 = f_5 \cdot e_8 \]
\[ E_9 = \frac{1}{C_7} \cdot e_9 \]
\[ f_9 = \frac{1}{C_7} \cdot e_9 \]

\[ \frac{dp_2}{dt} = \frac{1}{T_2} \cdot p_2 - R_6 \cdot e_8 - \frac{1}{C_7} \cdot e_9 \]

\[ \frac{dE_2}{dt} = f_5 = f_6 = \frac{1}{T_2} \cdot p_2 - e_8 \]

\[ \frac{dE_8}{dt} = \frac{1}{T_2} \cdot p_2 - e_8 \]

State Space Form

\[
\begin{bmatrix}
\frac{dp_2}{dt} \\
\frac{dE_2}{dt} \\
\frac{dE_8}{dt}
\end{bmatrix} = \begin{bmatrix}
-\frac{R_6}{T_2} & -\frac{1}{C_7} & 0 \\
1 & -\frac{1}{T_2} & 0 \\
0 & 0 & -\frac{1}{C_7}
\end{bmatrix} \begin{bmatrix}
p_2 \\
e_2 \\
e_8
\end{bmatrix} + \begin{bmatrix}
1 \\
0 \\
0
\end{bmatrix} \begin{bmatrix}
f_5 \\
f_6 \\
f_8
\end{bmatrix}
\]
Individual Equations

$E_1 = SE_1$
$E_2 = E_1 - E_3$
$E_3 = E_5$
$E_4 = E_5$
$E_5 = E_6 + E_7$
$E_6 = f_6 R_6$
$E_7 = \frac{1}{I_2} P_2$
$E_8 = E_4$
$E_9 = E_5$
$E_{10} = E_6 - E_4$
$E_{11} = \frac{1}{I_2} P_2 - R_6 SE_8 - \frac{1}{C_7} Q_1$

$\frac{dp_2}{dt} = E_2$
$\frac{dp_3}{dt} = E_3$
$\frac{dp_4}{dt} = E_4$
$\frac{dp_5}{dt} = E_5$
$\frac{dp_6}{dt} = E_6$

System Equations

\[
\frac{dp_2}{dt} = \left[ \begin{array}{cc} -\frac{R_6}{I_2} & -\frac{1}{C_7} \\ \frac{1}{I_2} & 0 \end{array} \right] \frac{p_2}{dt} + \left[ \begin{array}{c} 0 \\ 1 \end{array} \right] SE_8
\]
\[ t_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} \cdot p_2 \]
\[ e_7 = \frac{1}{C_7} \cdot q_7 \]
\[ f_7 = f_3 \]
\[ dq_7 = f_5 = f_6 = \frac{1}{I_2} \cdot p_2 - 5 \cdot q_7 \]
\[ \frac{dp_2}{dx} = e_2 \]
\[ e_2 = e_5 \]
\[ t_3 = t_2 \]
\[ e_4 = e_5 \]
\[ f_4 = f_5 \]
\[ e_5 = e_6 + c_7 \]
\[ f_5 = t_3 - t_4 \]

**State space form**

\[
\begin{bmatrix}
\frac{dp_2}{dx} \\
\frac{dq_7}{dx}
\end{bmatrix} =
\begin{bmatrix}
-\frac{1}{I_2} & -\frac{1}{C_7} \\
\frac{1}{I_2} & 0
\end{bmatrix}
\begin{bmatrix}
p_2 \\
q_7
\end{bmatrix} +
\begin{bmatrix}
0 \\
1 - \frac{1}{I_2}
\end{bmatrix}
\begin{bmatrix}
s_1 \\
s_2
\end{bmatrix} +
\begin{bmatrix}
s_1 \\
s_2
\end{bmatrix}
\[ t_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{\frac{dp_2}{dt}} = e_2 \]
\[ e_3 = e_5 \]
\[ t_3 = t_2 \]
\[ e_4 = e_5 \]
\[ +4 = f_8 \]
\[ e_5 = e_6 + c_7 \]
\[ f_5 = t_3 - f_4 \]

\[ e_7 = \frac{1}{97} \]
\[ f_7 = f_3 \]
\[ d\frac{p_2}{dt} = \frac{1}{C_7} p_2 - R_6 \cdot \frac{dt}{C_7} - \frac{1}{97} \]

\[ d\frac{q_7}{dt} = \frac{1}{I_2} p_2 - 5 f_8 \]

State space form:
\[
\begin{bmatrix}
\frac{dp_2}{dt} \\
\frac{dq_7}{dt}
\end{bmatrix} =
\begin{bmatrix}
\frac{-26}{I_2} & -\frac{1}{C_7} \\
\frac{1}{I_2} & 0
\end{bmatrix}
\begin{bmatrix}
p_2 \\
q_7
\end{bmatrix} +
\begin{bmatrix}
0 \\
1 - R_6
\end{bmatrix}
\begin{bmatrix}
f_8
\end{bmatrix}
\]

\[ 1 \times 4 = \]
\[ t_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} \int p_2 \, dt \]
\[ \sqrt{\frac{dp_2}{dt}} = e_2 \]
\[ e_3 = e_5 \]
\[ f_3 = f_2 \]
\[ e_4 = e_5 \]
\[ f_4 = f_8 \]
\[ e_5 = e_6 + e_7 \]
\[ f_5 = f_4 - f_4 \]

\[ e_7 = \frac{1}{97} \]
\[ f_7 = f_5 \]
\[ \frac{da_7}{dt} = f_5 = f_6 = \frac{1}{I_2} \int p_2 - 5f_8 \]
\[ da_7 = \frac{1}{I_2} (p_2 - 5f_8) \]

**State space form**

\[
\begin{bmatrix}
\frac{dp_2}{dt} \\
\frac{da_7}{dt}
\end{bmatrix} =
\begin{bmatrix}
-\frac{2}{I_2} & -\frac{1}{97} \\
\frac{1}{I_2} & 0
\end{bmatrix}
\begin{bmatrix}
p_2 \\
a_7
\end{bmatrix}
+ \begin{bmatrix}
0 \\
-1
\end{bmatrix} \begin{bmatrix}
5f_8
\end{bmatrix}
\]

\[ 1 \times 4 = [A] \]
\[ e_7 = \frac{1}{97} \]
\[ f_7 = f_5 \]
\[ e_8 = e_4 \]
\[ f_8 = f_6 \]
\[ e_5 = e_6 + f_7 \]
\[ f_5 = f_3 - f_4 \]

\[ \frac{dp_2}{dt} = e_2 \]
\[ \frac{d\theta_7}{dt} = \frac{1 - \frac{1}{97}}{s_7} \]
\[ \frac{dp_2}{dt} = s_1 - \frac{2e_2}{I_2} - R_6 - f_8 - \frac{1}{97} \]

\[ \frac{d\theta_7}{dt} = \frac{1}{I_2} p_2 - s_8 \]

\[ \frac{d\theta_7}{dt} = \frac{1}{I_2} p_2 - s_8 \]
\[ t_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ \sqrt{\frac{dp_2}{dt}} = e_2 \]
\[ e_3 = e_5 \]
\[ t_3 = t_2 \]
\[ e_4 = e_5 \]
\[ t_4 = t_5 \]
\[ e_5 = e_6 + e_7 \]
\[ t_5 = t_3 - t_4 \]

\[ e_7 = \frac{1}{I_2} q_7 \]
\[ f_7 = f_5 \]
\[ a_7 = f_5 \]
\[ e_8 = e_4 \]
\[ t_8 = t_7 \]
\[ f_8 = f_7 \]

\[ \frac{dp_2}{dt} = S_1 - \frac{R_2}{I_2} p_2 - R_6 s_5 p_8 - \frac{1}{C_7} q_7 \]

\[ \frac{dq_7}{dt} = \frac{1}{I_2} p_2 - s_5 q_8 \]

Static space form

\[ \begin{bmatrix} \frac{dp_2}{dt} \\ \frac{dq_7}{dt} \end{bmatrix} = \begin{bmatrix} -\frac{R_2}{I_2} & -\frac{1}{C_7} \\ \frac{1}{I_2} & 0 \end{bmatrix} \begin{bmatrix} p_2 \\ q_7 \end{bmatrix} + \begin{bmatrix} S_1 \\ 0 \end{bmatrix} \]

\[ \begin{bmatrix} 1 & 0 \end{bmatrix} = \begin{bmatrix} A \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \]
\[ t_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{e_2} p_2 \]
\[ e_7 = s = e_1 - \frac{1}{e_2} p_2 - R_{s6}\]
\[ -6.5 e_8 - \frac{1}{e_2} g_7 \]

\[ \frac{dp_2}{dx} = e_2 \]
\[ f_7 = f_2 \]
\[ f_8 = f_5 \]
\[ e_8 = e_4 \]
\[ f_8 = f_5 \]
\[ e_5 = e_5 + e_7 \]
\[ f_5 = f_1 - f_3 \]

**State space form**

\[ \begin{bmatrix} \frac{dp_2}{dx} \\ \frac{dg_7}{dx} \end{bmatrix} = \begin{bmatrix} -\frac{e_2}{e_2} & \frac{1}{e_2} \\ 1 & 0 \end{bmatrix} \begin{bmatrix} p_2 \\ g_7 \end{bmatrix} + \begin{bmatrix} 1 \\ -R_{s6} \end{bmatrix} \frac{d}{dx} \]

\[ \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} A & \begin{bmatrix} 1 \\ 0 \end{bmatrix} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} B \end{bmatrix} \]
\[ t_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{I_2} p_2 \]
\[ e_7 = \frac{1}{97} \]
\[ f_7 = f_5 \]
\[ e_8 = e_4 \]
\[ f_8 = f_6 \]
\[ e_5 = e_6 + e_7 \]
\[ f_5 = f_3 - f_4 \]

\[ dp_2 \]
\[ df_2 = e_2 \]

\[ ds = 1 - \frac{2c}{R_2} p_2 - R_6 s \]
\[ 1 - \frac{2c}{R_2} - \frac{1}{97} \]

\[ \frac{dp_2}{dt} \]
\[ \frac{df_2}{dt} = f_5 = f_6 = \frac{1}{I_2} p_2 - 5s \]

\[ \frac{d\theta_1}{dt} = \frac{1}{I_2} p_2 - 5s \]

\[ \frac{d\theta_7}{dt} = \frac{1}{I_2} p_2 - 5s \]

**State space form**

\[
\begin{bmatrix}
\frac{dp_2}{dt} \\
\frac{df_2}{dt}
\end{bmatrix} =
\begin{bmatrix}
\frac{2c}{R_2} & -\frac{1}{97} \\
-I_2 & 0
\end{bmatrix}
\begin{bmatrix}
p_2 \\
f_2
\end{bmatrix} +
\begin{bmatrix}
1 \\
-\frac{2c}{R_2}
\end{bmatrix}
\]

\[ \begin{bmatrix}
p_1 \\
f_1
\end{bmatrix} =
\begin{bmatrix}
A & 0 \\
0 & B
\end{bmatrix}
\begin{bmatrix}
p_2 \\
f_2
\end{bmatrix} +
\begin{bmatrix}
f_3 \\
C
\end{bmatrix}
\]
\[ t_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} p_2 \]
\[ t_3 = f_2 \]
\[ e_3 = e_5 \]
\[ f_3 = f_5 \]
\[ e_4 = e_5 \]
\[ f_4 = f_5 \]
\[ e_5 = e_6 + c_7 \]
\[ f_5 = f_3 - f_4 \]

\[ \frac{dp_2}{dt} = e_2 \]

\[ \frac{dq_1}{dt} = \frac{-p_2}{I_2} - \frac{1}{c_7} p_2 - R_6 S F P - \frac{1}{c_7} q_1 \]

\[ \frac{dq_7}{dt} = \frac{1}{I_2} p_2 - S F P \]

**State Space Form**

\[ \frac{dp_2}{dt} = \begin{bmatrix} -\frac{p_2}{I_2} & -\frac{1}{c_7} \\ \frac{1}{I_2} & 0 \end{bmatrix} \begin{bmatrix} p_2 \\ q_1 \end{bmatrix} + \begin{bmatrix} 1 \\ -R_6 S F P \end{bmatrix} q_7 \]

\[ t \times 1 = [ A ] t \times 1 + [ B ] q_7 \]

State Space
\[ t_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{I_2} q_2 \]
\[ v = \frac{dp_2}{dt} = e_2 \]
\[ e_3 = e_5 \]
\[ f_3 = f_2 \]
\[ e_4 = e_5 \]
\[ f_4 = f_8 \]
\[ e_5 = e_6 + e_7 \]
\[ f_5 = f_3 - f_4 \]
\[ e_7 = \frac{1}{C_7} \]
\[ \frac{dp_2}{dt} = e_2 \]
\[ \frac{dq_7}{dt} = f_5 = f_6 = \frac{1}{I_2} p_2 - s f_8 \]
\[ \frac{dq_7}{dt} = \frac{1}{I_2} p_2 - s f_8 \]
\[ \text{State Space Form} \]
\[ \begin{pmatrix} \frac{dp_2}{dt} \\ \frac{dq_7}{dt} \end{pmatrix} = \begin{bmatrix} -\frac{1}{C_7} & -\frac{1}{I_2} \\ \frac{1}{I_2} & 0 \end{bmatrix} \begin{pmatrix} p_2 \\ q_7 \end{pmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} s f_8 \]
\[ \begin{pmatrix} p_2 \\ q_7 \end{pmatrix} = \begin{bmatrix} A & B \end{bmatrix} \begin{bmatrix} v \\ u \end{bmatrix} \]
\[ \text{State Space} \]
\[ f(t) = \begin{cases} \text{Sin} & \text{for} \ t \leq T_1 \\ \text{Cos} & \text{for} \ T_1 < t \leq T_2 \\ 0 & \text{for} \ t > T_2 \end{cases} \]

\[ f(t) = \begin{cases} \text{Sin} & \text{for} \ t \leq T_1 \\ \text{Cos} & \text{for} \ T_1 < t \leq T_2 \\ 0 & \text{for} \ t > T_2 \end{cases} \]

\[ \frac{df_2}{dt} = e_2 \]

\[ e_2 = e_1 - e_3 \]

\[ e_3 = e_5 \]

\[ e_4 = \frac{f_6}{R_2} \]

\[ e_5 = \frac{f_6}{R_6} \]

\[ e_6 = e_7 \]

\[ e_7 = \frac{1}{C_7} \]

\[ f_6 = f_5 = f_3 - f_4 = f_2 - f_8 \]

\[ f_8 = \frac{1}{I_2} \left( P_2 - s \bar{F}_B \right) \]

\[ \frac{dp_2}{dt} = e_2 \]

\[ \frac{dp_2}{dt} = e_2 \]

\[ \frac{d\theta}{dt} = f_5 = f_6 - \frac{1}{C_7} P_2 \]

\[ \frac{d\theta}{dt} = f_5 = f_6 - \frac{1}{C_7} P_2 \]

\[ \frac{d\theta}{dt} = f_5 = f_6 - \frac{1}{C_7} P_2 \]
loading from "session.bg", done
previous session loaded (from "session") and placed
Individual Equations

\[ e_1 = \text{SE}_1 \]
\[ f_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{f_1} f_2 \]
\[ e_3 = e_5 \]

\[ d \frac{dp}{x} = e_2 \]
\[ d \frac{e_1}{x} = f_5 \]
\[ e_3 = e_5 \]
Individual Equations:

\[ e_1 = SE_1 \]
\[ t_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{2} f_1 t_2 \]
\[ e_3 = e_5 \]
\[ \frac{d\Delta p_1}{dt} = e_2 \]
\[ \frac{d\Delta q_1}{dt} = f_5 \]

Previous session loaded (from "session") and placed can't locate "from" element for bond! Can't locate "from" element for bond! New element "SE"
Individual Equations:

\[ e_1 = \delta e_1 \]
\[ t_1 = f_2 \]
\[ f_2 = e_1 - e_3 \]
\[ e_3 = e_5 \]
\[ e_4 = f_6 \]
\[ f_6 = f_5 \]
\[ f_7 = f_5 \]

\[ \delta p_2 = e_2 \]
\[ \frac{dp_2}{dt} = e_2 \]
\[ e_0 - e_4 \]

DOSBox 0.70, CPU speed: 3000 cycles, Frameskip 0, Program: CAMP001

Can't locate "from" element for bond!
New element "$SE"
New element "1"
Bond from $SE to 1 (bond 1)
Individual Equations

\[ R \]

\[ E_1 = SE_1 \]
\[ t_1 = f_2 \]
\[ t_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{t_1} t_2 \]
\[ f_7 = f_5 \]
\[ \frac{d}{d\tau} p_2 = e_2 \]
\[ e_3 = e_5 \]
\[ e_1 = \phi_1 \]
\[ e_2 = \phi_2 \]
\[ e_3 = e_1 - e_2 \]
\[ f_1 = f_2 \]
\[ f_6 = f_5 \]
\[ f_7 = f_5 \]

Individual Equations:

\[ \phi_1 = \frac{1}{\kappa} \int_0^t f(\tau) \, d\tau + \frac{1}{\kappa} \phi(0) \]

\[ \phi_2 = \frac{1}{\kappa} \int_0^t f(\tau) \, d\tau + \frac{1}{\kappa} \phi(0) \]

\[ \phi_3 = \frac{1}{\kappa} \int_0^t f(\tau) \, d\tau + \frac{1}{\kappa} \phi(0) \]

\[ \phi_4 = \frac{1}{\kappa} \int_0^t f(\tau) \, d\tau + \frac{1}{\kappa} \phi(0) \]

Bond from SE to 1 (bond 1)
Bond from 1 to I (bond 2)
New element "I"
New element "g"
Individual Equations:

\[ e_1 = S E_1 \]
\[ t_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{T_2} p_2 \]
\[ e_3 = e_5 \]

\[ \frac{d^2 p_2}{dt^2} = e_2 \]

New element "I"
- bond from 1 to 1 (bond 2)
- new element "o"
- bond from 1-1 to 0 (bond 3)
Individual Equation R

\[ e_1 = \overline{SE1} \]

\[ f_1 = f_2 \]

\[ t_2 = e_1 - e_3 \]

\[ f_2 = \frac{1}{t_2} \]

\[ e_7 = \frac{1}{9} e_7 \]

\[ \frac{dp_2}{dt} = e_2 \]

\[ \frac{dp_2}{dt} = f_5 \]

\[ e_3 = e_5 \]

DOSBox 0.74, CPU speed: 3000 cycles, Frameskip 0, Program: CAMPG001

- New element "0"
  - bond from 1-1.2 to 0 (bond 3)
- New element "1"
  - bond from 0.3 to 1 (bond 4)
Individual Equations

\[ e_1 = S e_1 \]
\[ t_1 = f_2 \]
\[ t_2 = e_1 - e_3 \]
\[ t_3 = \frac{1}{t_2} t_2 \]
\[ f_2 = f_5 \]
\[ f_3 = f_5 \]

\[ \frac{d}{dt} p_2 = e_2 \]
\[ \frac{d}{dt} a_7 = f_5 \]
\[ e_3 = e_5 \]
Individual Equations:

\[ e_1 = \text{SE}_1 \]
\[ t_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{I_z} t_2 \]
\[ f_6 = f_5 \]
\[ e_7 = \frac{1}{2} e_7 \]
\[ f_7 = f_5 \]

\[ \frac{dp_2}{dt} = e_2 \]
\[ \frac{dp_4}{dt} = e_5 \]

New element "1":
- bond from 0.3-4 to 1 (bond 5)

New element "R":
- bond from 1.5 to R (bond 6)
Individual Equation R

\[ E_1 = \text{SE}_1 \]
\[ t_1 = f_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{t_2} \]
\[ e_7 = \frac{1}{g_7} \]
\[ \frac{\partial p_2}{\partial t} = e_2 \]
\[ \frac{\partial q_2}{\partial t} = e_3 \]

\[ f_6 = f_5 \]
\[ f_7 = f_5 \]
Individual Equations

\[ e_1 = SE_1 \]
\[ e_2 = e_1 - e_3 \]
\[ f_1 = f_2 \]
\[ f_2 = \frac{1}{I_2} f_2 \]

Graph:
- New element "R"
- Bond from 1-5 to R (bond 6)
- New element "C"
- Bond from 1-5-6 to C (bond 7)
Individual Equations

\[ e_1 = \text{SE1} \]
\[ t_1 = t_2 \]
\[ e_2 = e_1 - e_3 \]
\[ f_2 = \frac{1}{I_1} f_p_2 \]
\[ e_3 = e_5 \]
\[ \frac{\partial p_2}{\partial t} = e_2 \]
\[ \frac{\partial e_1}{\partial t} = f_6 \]
\[ f_6 = f_5 \]
\[ f_7 = f_5 \]

New element "R"
bond from 1-5 to R (bond 6)
New element "C"
bond from 1-5-6 to C (bond 7)
Individual Equations

\[ e_1 = f_1 e_1 \]
\[ e_2 = e_1 - e_3 \]
\[ e_3 = e_5 \]

\[ t_1 = t_2 \]
\[ t_2 = \frac{1}{t_2} t_2 \]

\[ f_6 = f_5 \]
\[ f_7 = f_5 \]

\[ df_2 = e_2 \]
\[ dp_2 = e_2 \]
Individual Equations:

\[ E_1 = S E_1 \]
\[ E_2 = E_1 - E_3 \]
\[ E_3 = E_5 \]
\[ E_4 = S F_6 \]
\[ E_5 = E_7 \]

\[ R_{1} = F_{2} \]
\[ R_{2} = \frac{1}{R_{2}} P_{2} \]
\[ R_{3} = F_{5} \]
\[ R_{4} = F_{7} \]

\[ \Delta P_{2} = E_{2} \]
\[ \delta P_{2} = \frac{d E_{2}}{d R} \]

\[ \delta P_{2} = E_{2} \]

DOSBox 0.74, Cpu speed: 3000 cycles, Frameskip 0, Program: CAMPG001

- New Element "C": bond from 1-5-6 to C (bond 7)
- New Element "SF": bond from 1-4 to SF (bond 8)
Individual Equations:

\[ \begin{align*}
  e_1 &= S E_1 \\
  t_1 &= t_2 \\
  e_2 &= e_1 - e_3 \\
  t_2 &= \frac{1}{I_2} t_2 \\
  e_3 &= \frac{1}{g_3} e_7 \\
  e_7 &= f_5 \\
  e_4 &= f_6 R_6 \\
  f_6 &= f_5 \\
  f_7 &= f_5 \\
  v_2\frac{dp_2}{dt} &= e_2 \\
  \frac{dp_2}{dt} &= e_2 \\
\end{align*} \]
Individual Equations:

\[ e_1 = \text{SE}_1 \]
\[ e_2 = e_1 - e_3 \]
\[ t_2 = \frac{1}{l_2} \cdot p_2 \]
\[ f_2 = f_3 \]
\[ v_{dp_2} = e_2 \]
\[ f_7 = f_5 \]
\[ e_3 = e_5 \]
Individual Equation \( R \)

\[ e_1 = SE_1 \]

\[ f_1 = f_2 \]

\[ e_2 = e_1 - e_3 \]

\[ f_2 = \frac{1}{I_2} p_2 \]

\[ \frac{d p_2}{d t} = e_2 \]

\[ e_3 = e_5 \]

\[ f_6 = f_5 \]

\[ \frac{d e_7}{d t} = f_7 \]

\[ \frac{d q_7}{d t} = e_7 \]

\[ \frac{d p_2}{d t} = e_2 \]

\[ e_5 = \frac{1}{I_2} q_7 \]

\[ \frac{d q_7}{d t} = f_7 \]

\[ \frac{d e_5}{d t} = f_5 \]
This is a Classroom License for instructional use only. Research and commercial use is prohibited.
% CAMP-G/MATLAB - Numeric State Space Model
%
% Generates: Numeric A,B,C,D matrices
% Numeric Transfer Functions
% Uses: Frequency Response using Transfer Functions
% Rlocus using numeric Transfer Functions.
% MATLAB Control system tool box operations
% using numeric transfer functions.

clear
more off

-- Initial conditions .......
Q7IN= ?? ; P2IN= ?? ;
initial = [Q7IN: P2IN] ;

...... System Physical Parameters .......
global I2 R6 C7
Define system physical parameters and system matrices numeric values
R6 = ?? ; C7 = ?? ;

...... External inputs se(t), sf(t) .......
global SE1 SFS
fprintf ('\n Inputs Vector ')
fprintf ('\n u=[ SE1 SFS ] ')
fprintf ('\n Input # 1 is SE1'
fprintf ('\n Input # 2 is SFS')

% e3 = e4
% e0 - e4
dg2 = f5 = f6 = l = p = s 
%
\[ e_3 = e_5 \]

\[ \frac{d}{dt} e_3 = f_5 = f_6 \]

\[ p_1 = p_6 \]

\[ a_t = e_4 \]

\[ \text{more on} \]

\[ \text{Initial conditions} \]

\[ Q1IN = ?; \quad P2IN = ?; \]

\[ \text{initial} = [Q1IN; \quad P2IN]; \]

\[ \text{...... System Physical Parameters ..........} \]

\[ \text{global I2 R6 C7} \]

\[ \text{Convert system physical parameters and system matrices to symbols} \]

\[ \text{sym sb I2 R6 C7} \]

\[ I2 = ?; \]

\[ R6 = ?; \quad C7 = ?; \]

\[ \text{...... External inputs } u(t), \quad s(t) \text{ ..........} \]

\[ \text{global SE1 SFS} \]

\[ \text{fprintf ('\textbf{\textbar In\textbar Inputs Vector \textbar}')} \]

\[ \text{fprintf ('\textbf{\textbar N \textbar u=[ SE1 SFS ] \textbar}')} \]

\[ \text{fprintf ('\textbf{\textbar N \textbar Input \# 1 is SE1 \textbar}')} \]

\[ \text{fprintf ('\textbf{\textbar N \textbar Input \# 2 is SFS \textbar}')} \]

\[ \text{SE1 = ?; \quad SFS = ?;} \]

\[ p_q = [Q7; \quad P2]; \]

\[ \text{fprintf ('\textbf{\textbar N \textbar State variables vector \textbar}')} \]

\[ \text{fprintf ('\textbf{\textbar N \textbar p_q=[Q7;P2];\n\textbar}')} \]

\[ \text{System Differential Equations-First Order Form} \]

\[ \text{Derivatives vector} \]

\[ p_{qdot} = [dQ7; \quad dP2]; \]

\[ \text{...... System Differential Equations-State Space Form A, B, C, D symbolic matrices} \]

\[ \text{(Continued on next page)} \]
\[ e_3 = e_5 \]

\[ \sqrt{a} \cdot e_0 - e_1 \]

\[ x_2 = f_5 = f_6 - \frac{1}{p} \]

\[ s \cdot e_1 \]
% dQ7 = P2/I2 - SF8
% dP2 = SE1 - P2/I2*R6 + SF8*R6 - Q7/C7

A(1,:) = [sb, sb];
A(1,:) = [0, 1/I2];
B(1,:) = [sb, sb];
D(1,:) = [sb, sb];
B(1,:) = [0, -1];
A(2,:) = [-1/C7, -1/I2*R6];
B(2,:) = [1, +1*R6];

% Generate C and D matrices corresponding to o:

% --- 4/3/2012 10
% dQ7=P2/I2-SF8
% Number of States 2
A(1,:) = [sb, sb];
A(1,:) = [0, 1/I2];
B(1,:) = [sb, sb];
B(1,:) = [0, -1];
% dP2=SE1-P2/I2*R6+SF8*R6-Q7/C7
A(2,:) = [-1/C7, -1/I2*R6];
B(2,:) = [1, +1*R6];
% Generate C and D matrices corresponding to o:

...Generation of A, B matrices corresponding to:

%  dQ7=P2/I2-SF8

%  ... Number of States  2

A(1,:) = [sb,sb];
A(1,:) = [0,1/I2];
B(1,:) = [sb,sb];
D(1,:) = [sb,sb];
B(1,:) = [0,-1];

%  dP2=SE1-P2/I2*R6+SF8*R6-Q7/C7

A(2,:) = [-1/C7,-1/I2*R6];
B(2,:) = [1,+1*R6];

%  Generate C and D matrices corresponding to:

%  %
41                dQ7=P2/I2-SF8
42                % ... Number of States  2
43 -                A(1,:) = [sb,sb];
44 -                A(1,:) = [0,1/I2];
45 -                B(1,:) = [sb,sb];
46 -                D(1,:) = [sb,sb];
47 -                B(1,:) = [0,-1];
48 -                dP2=SF8*R6-Q7/C7
49 -                A(2,:) = [-1/C7,-1/I2*R6];
50 -                B(2,:) = [1,1*R6];
51 -                % Generate C and D matrices corresponding to o:
52 -                %
dQ7=P2/I2-SF8

Number of States

A(1,:) = [sb,sb];
A(1,:) = [0,1/I2];
B(1,:) = [sb,sb];
B(1,:) = [0,-1];
D(1,:) = [sb,sb];

dp2=SE1-P2/I2*R6+SF8

A(2,:) = [-1/C7,-1/]
B(2,:) = [1,+1*R6];

Generate C and D matrix

f6 = f5 = f3 - f4 = \frac{1}{I2} - P2 - SF8
f6 = f5 = SE1 - \frac{R6}{I2} P2 - SF8 - \frac{1}{C7} Q7
f6 = f5 = SE1 - \frac{R6}{I2} P2 - SF8 - \frac{1}{C7} Q7
f6 = f5 = SE1 - \frac{R6}{I2} P2 - SF8 - \frac{1}{C7} Q7
f6 = f5 = SE1 - \frac{R6}{I2} P2 - SF8 - \frac{1}{C7} Q7
f6 = f5 = SE1 - \frac{R6}{I2} P2 - SF8 - \frac{1}{C7} Q7
f6 = f5 = SE1 - \frac{R6}{I2} P2 - SF8 - \frac{1}{C7} Q7
\text{... Number of States}\n\begin{align*}
A(1,:) &= [sb, sb]; \\
A(1,:) &= [0, 1/I2]; \\
B(1,:) &= [sb, sb]; \\
B(1,:) &= [0, -1]; \\
dP2 &= SE1 - P2/I2*R6 + SF8*R6; \\
A(2,:) &= [-1/C7, -1/I2*] \\
B(2,:) &= [1, +1*R6]; \\
\end{align*}
\text{Generate C and D matrix...}
\begin{align*}
\text{dQ7} &= P2/I2 - SF8 \\
\text{Number of States} \\
A(1,:) &= [s_b, s_b] \\
A(1,:) &= [0, 1/I2] \\
B(1,:) &= [s_b, s_b] \\
B(1,:) &= [0, -1] \\
\text{dP2} &= SE1 - P2/I2 * R6 + SF8 * R \\
A(2,:) &= \left[ -1/C7, -1/I2 \right] \\
B(2,:) &= \left[ 1, +1*R6 \right] \\
\text{Generate C and D matrix} \\
\end{align*}

\begin{align*}
4 = f_6 R_6 \\
6 = f_5 \\
7 = \frac{1}{C7} \\
\frac{dP2}{dx} &= SE1 - \left( \frac{1}{I2} P2 - SF8 \right) R6 - \frac{1}{C7} \\
8 = e_4 \\
\frac{dQ7}{dx} &= f_5 = f_6 = \frac{1}{I2} P2 - SF8 \\
8 = SF8 \\
\frac{dQ7}{dx} &= \frac{1}{I2} P2 - SF8 \\
\end{align*}
\[ dQ7 = \frac{P2}{I2} - SF8 \]

... Number of States

\[
\begin{align*}
A(1,:) &= [sb, sb]; \\
A(1,:) &= [0, 1/I2]; \\
B(1,:) &= [sb, sb]; \\
D(1,:) &= [sb, sb]; \\
B(1,:) &= [0, -1]; \\
\end{align*}
\]

\[ dP2 = SE1 - \frac{P2}{I2} \times R6 + SF8 \times R7 \]

\[
\begin{align*}
A(2,:) &= [-1/C7, -1/I2*]
B(2,:) &= [1, +1*R6]; \\
\end{align*}
\]

\% Generate C and D matrix

\[ \frac{dQ7}{dt} = f5 = f6 = f7 = f8 \]

\[
\begin{align*}
\frac{dP2}{dt} &= SE1 - \frac{R6}{I2} \times \frac{P2}{I2} - SF8 - \frac{1}{C7} \times G7 \\
\end{align*}
\]
% dQ7 = P2/I2 - SF8

... Number of States
A(1,:) = [sb, sb];
A(1,:) = [0, 1/I2];
B(1,:) = [sb, sb];
B(1,:) = [0, -1];
D(1,:) = [sb, sb];
D(1,:) = [0, -1];

% dP2 = SE1 - P2/I2*R6 + SF8*R6
A(2,:) = [-1/C7, -1/I2];
B(2,:) = [1, +1*R6];

% Generate C and D matrix

\[ \frac{1}{I_2} P_2 - SF8 \]

\[ c = f_6 R_6 \]

\[ 6 = f_5 \]

\[ f_5 = \frac{1}{I_2} P_2 - SF8 = \frac{1}{I_2} c_7 \]

\[ f_4 = \frac{1}{c_7} \]

\[ \frac{df_2}{dt} = f_5 = f_6 = \frac{1}{I_2} P_2 - SF8 \]

\[ \frac{df_7}{dt} = \frac{1}{I_2} P_2 - SF8 \]
% dQ7=P2/I2-SF8
% ... Number of States 2
A(1,:) = [sb, sb];
A(1,:) = [0, 1/I2];
B(1,:) = [sb, sb];
D(1,:) = [sb, sb];
B(1,:) = [0, -1];
% dP2=SE1-P2/I2*R6+SF8*R6-Q7/C7
A(2,:) = [-1/C7, -1/I2*R6];
B(2,:) = [1, +1*R6];
% Generate C and D matrices corresponding to o:
%
% dQ7 = P2/I2 - SF8

% Number of States
A(1,:) = [sb,sb];
A(1,:) = [0,1/I2];
B(1,:) = [sb,sb];
B(1,:) = [0,-1];

% dP2 = SE1 - P2/I2*R6 + SF8*R6
A(2,:) = [-1/C7,-1/I2*];
B(2,:) = [1,1*R6];

% Generate C and D matrix

\[
\frac{dx}{dt} = f_6 R_6 \quad \text{or} \quad \frac{dx}{dt} = f_5 R_6.
\]
\[
\frac{dx}{dt} = f_6 = \frac{1}{I_2} P_2 - SF8
\]
\[
\frac{dx}{dt} = f_5 = f_6 = \frac{1}{I_2} P_2 - SF8
\]
\[
\frac{dx}{dt} = f_7 = \frac{1}{I_2} P_2 - SF8
\]
% dQ7=P2/I2-SF8
% ... Number of States 2

A(1,:) = [sb,sb];
A(1,:) = [0,1/I2];
B(1,:) = [sb,sb];
D(1,:) = [sb,sb];
B(1,:) = [0,-1];

% dP2=SE1-P2/I2*R6+SF8*R6-Q7/C7

A(2,:) = [-1/C7,-1/I2*R6];
B(2,:) = [1,1*I*R6];

% Generate C and D matrices corresponding to o:

% f6 = \frac{1}{I_2} P_2 - SF8
\[
\frac{1}{I_2} p_2 - 5 = b
\]

\[
- \frac{1}{I_2} p_2 - R_6.5 = c
\]

\[
- \frac{R_6}{I_2} p_2 - R_6.5 = e - 1\frac{g}{c_7}
\]

\[
- \frac{1}{I_2} p_2 - 5 = f_6 = \frac{1}{I_2} p_2 - 5f_8
\]

\[
A_7 = \frac{1}{I_2} p_2 - 5f_8
\]
%\text{dQ7}\text{=}p2/i2-sf8

% \text{Number of States 2}
A(1,:) = [sb,sb];
A(1,:) = [0,1/i2];
B(1,:) = [sb,sb];
D(1,:) = [sb,sb];
B(1,:) = [0,-1];

% \text{dP2}\text{=}se1-p2/i2*6+sf8*6-q7/c7
A(2,:) = [-1/c7,-1/i2*6];
B(2,:) = [1,1*6];

% Generate C and D matrices corresponding to o:
40  %
41  dQ7=P2/I2-SF8
42  
43  ... Number of States  2
44  A(1,:) = [sb,sb];
45  A(1,:) = [0,1/I2];
46  B(1,:) = [sb,sb];
47  B(1,:) = [0,-1];
48  
49  dP2=SE1-P2/I2*R6+SF8*R6-Q7/C7
50  A(2,:) = [-1/C7,-1/I2*R6];
51  B(2,:) = [1,+1*R6];
52  
53  % Generate C and D matrices corresponding to o:
54  
\[
\begin{align*}
\frac{1}{I_2}P_2 - SF8 & \quad B \\
-(\frac{1}{I_2}P_2 - SF8)R_6 - \frac{1}{C_7} & \quad C \\
-\frac{R_6}{I_2}P_2 - R_6SF8 - \frac{1}{C_7} & \quad D \\
\end{align*}
\]

\[
\mathbf{A} = \begin{pmatrix} 
1 & 0 \\
0 & 1 
\end{pmatrix}
\]

\[
f(x) \quad \text{more} \]
MATLAB 7.12.0 (R2011a)

Command Window

New to MATLAB? Watch this Video, see Demos, or read Getting Started.

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B MATRIX

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</table>

C MATRIX

fx --more--
Output Variables Vector

A MATRIX

\[
\begin{pmatrix}
0 & 1 \\
0 & I2 \\
1 & R6 \\
C7 & I2 \\
\end{pmatrix}
\]

B MATRIX

\[
\begin{pmatrix}
0 & -1 \\
\end{pmatrix}
\]

fx
Output Variables Vector

A MATRIX

<table>
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<tbody>
<tr>
<td>0</td>
<td></td>
<td>I2</td>
</tr>
<tr>
<td></td>
<td>R6</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>I2</td>
</tr>
</tbody>
</table>

B MATRIX

fx | 0, -1 |
MATLAB 7.12.0 (R2011a)

New to MATLAB? Watch this Video, see Demos, or read Getting Started.

B MATRIX

| 0, -- |
| - - - |
| 1, R6 |

C MATRIX

fx --more--