

$$\begin{aligned}
& \text{[> restart :} \\
& \text{[> de := diff(x(t), t, t) + p_1(t) diff(x(t), t) + p_2(t) \cdot x;} \\
& \qquad \qquad \qquad de := \frac{d^2}{dt^2} x(t) + p_1(t) \left(\frac{d}{dt} x(t) \right) + p_2(t) x \qquad (1) \\
& \text{[> p_1(t) := 2 \cdot A \cdot \sin(t) ; p_2(t) := k + A \cdot \cos(t);} \\
& \qquad \qquad \qquad p_1 := t \mapsto 2 \cdot A \cdot \sin(t) \\
& \qquad \qquad \qquad p_2 := t \mapsto k + A \cdot \cos(t) \qquad (2) \\
& \text{[> p[1](t) ; p[2](t);} \\
& \qquad \qquad \qquad 2 A \sin(t) \\
& \qquad \qquad \qquad k + A \cos(t) \qquad (3) \\
& \text{[> x(t) := u(t) \cdot \exp^{I(t)} ;} \\
& \qquad \qquad \qquad x := t \mapsto u(t) \cdot \exp^{I(t)} \qquad (4) \\
& \text{[> eq := I(t) = int(p_1(t), t = 0 .. t)} \\
& \qquad \qquad \qquad eq := I = 2 A - 2 A \cos(t) \qquad (5) \\
& \text{[> dea := diff(u(t), t, t) + \left(p[2](t) - \frac{\text{diff}(p[1](t), t)}{2} - \frac{p[1](t)^2}{4} \right) u(t) = 0 ;} \\
& \qquad \qquad \qquad dea := \frac{d^2}{dt^2} u(t) + (k - A^2 \sin(t)^2) u(t) = 0 \qquad (6) \\
& \text{[> sol := dsolve(dea, u(t));} \\
& \qquad \qquad \qquad sol := u(t) = c_1 \text{MathieuC}\left(-\frac{A^2}{2} + k, -\frac{A^2}{4}, t\right) + c_2 \text{MathieuS}\left(-\frac{A^2}{2} + k, -\frac{A^2}{4}, t\right) \qquad (7) \\
& \text{[>}
\end{aligned}$$