Solution Methods

Restrictions / Method	System type			Input				Initial conditions		Result		
	Nonlinear systems	Linear systems	Lumped only	Any	Step, constant	Zero	Sine, cosine	Zero only	Any	Explicit y(t)	Qualitative information	Use result:
Numerical solution of state-space equations (Euler, Runga-Kutta, ode45)	✓	✓	✓	✓	✓	✓	✓		✓	Numerical		Directly
1st order time domain $y(t) = c_0 + c_1 e^{-t/\tau}$		✓	✓		✓	✓			✓	Optional	✓	Directly
2nd order time domain (pole positions, ς, ω_n)		✓	✓		✓	✓			✓	No	✓	*
Laplace transform		✓	✓	✓	✓	✓	✓		✓	✓		Directly
Transfer function $H(s)$		✓	✓	✓	✓		✓	✓		Optional	✓	For $\mathcal{L}^{-1}$, freq response, or pole position evaluation.
Impedance		✓	✓	✓	✓		✓	✓		Optional	✓	To obtain $H(s)$
Frequency response		✓	✓				✓	Not applicable—steady state only		Optional	✓	Directly

* No explicit solution is provided by this approach. You get information about the ring frequency and damping rate, or about the kind of solutions that are possible, but you must use another method, such as the Laplace transform, to obtain an explicit solution.