

Problem 15

Show that the solution of the initial value problem

$$mu'' + \gamma u' + ku = 0, \quad u(t_0) = u_0, \quad u'(t_0) = u'_0$$

can be expressed as the sum $u = v + w$, where v satisfies the initial conditions $v(t_0) = u_0$, $v'(t_0) = 0$, w satisfies the initial conditions $w(t_0) = 0$, $w'(t_0) = u'_0$, and both v and w satisfy the same differential equation as u . This is another instance of superposing solutions of simpler problems to obtain the solution of a more general problem.