

Exercise 12

In Exercises 9–12, show that the given function $u(x)$ is a solution of the corresponding Fredholm integro-differential equation:

$$u'''(x) = 1 + \sin x - \int_0^{\frac{\pi}{2}} (x-t)u(t) dt, \quad u(0) = 1, \quad u'(0) = 0, \quad u''(0) = -1, \quad u(x) = \cos x$$