

## Exercise 1

For each of the following integral equations, classify as Fredholm, Volterra, or Volterra-Fredholm integral equation and find its kind. Classify the equation as singular or not.

$$u(x) = 1 + \int_0^x u(t) dt$$

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### Solution

This is a Volterra integral equation because one of the limits of integration is not constant. It is of the second kind because the unknown function  $u$  appears both inside and outside the integral. It's inhomogeneous because of the 1. It's not singular since neither of the limits of integration are infinite and the integrand does not become infinite in the interval of integration.