

FRIEDHOLM INTEGRAL EQUATION →

A linear integral equation of the form

$$g(x) y(x) = f(x) + \lambda \int_a^b K(x, t) y(t) dt \rightarrow (1)$$

where a, b are both constants. $f(x)$, $g(x)$ and $K(x, t)$ are known functions while $y(x)$ is unknown function and λ is a non-zero real or complex parameter, is called Fredholm integral equation of third kind. The function $K(x, t)$ is known as the kernel of the integral equation.

(i) Fredholm integral equation of the first kind

A linear integral equation of the form by setting $g(x) = 0$ in (1)

$$f(x) + \lambda \int_a^b K(x, t) y(t) dt = 0 \rightarrow (2)$$

is known as Fredholm integral equation of the first kind

(ii) Fredholm integral equation of the second kind

A linear integral equation of the form by setting ~~$f(x) = 0$~~ in $g(x) = 1$ in (1)

$$y(x) = f(x) + \lambda \int_a^b K(x, t) y(t) dt \rightarrow (3)$$

is known as Fredholm integral equation of second kind

A linear integral Equation of the first kind is obtained by setting $f(x) = 0$ in (3)

$$y(x) = \lambda \int_a^b K(x,t) y(t) dt \rightarrow (4)$$

is known as the homogeneous Fredholm integral equation of the second kind

Note \rightarrow The equation in which both the limits are constant is called Fredholm linear integral equation.