

Lesson 38

1. What is a homogeneous integral equation?

If the function $F(x) = 0$ the integral equation is said to be homogeneous.

2. What is mean by (a) symmetric kernel (b) separable kernel for an integral equation?

The kernel is said to be symmetric if $K(x, \xi) = K(\xi, x)$. The kernel is said to be separable if $K(x, \xi) = K_1(\xi)K_2(x)$.

3. What are the characteristic values and characteristic functions for an integral equation?

If the kernel are separable in x and ξ , then the homogenous integral equation will have solutions for a finite number of values of the parameter λ . These values of λ are the characteristic values, and the corresponding solutions $y(x)$ are the characteristic functions.

If the kernel $K(x, \xi)$ is not separable in x and ξ then the integral equation has an infinite number of characteristic values and infinite number of characteristic functions.

4. When are the eigen functions orthogonal?

If $y_m(x)$ and $y_n(x)$ are characteristic functions corresponding to two different characteristic values λ_m and λ_n then it can be shown that for symmetric kernels these eigen functions are orthogonal over the interval (a, b) .

5. When are the eigen values of an integral equation real?

The eigen values of a Fredholm integral equation with real symmetric kernels are all real. A Fredholm equation with a non-symmetric kernel may possess eigen values that are not real.