

Singular Eigenvalue Problems

Find eigenvalues, eigenfunctions and function representations in text and exercises.

Eigenvalue problem	Eigenvalues	Eigenfunctions	Function representation
$\phi'' + \lambda^2 \phi = 0, 0 < x$ $\phi(0) = 0$ $\phi(x)$ bounded as $x \rightarrow \infty$	All $\lambda > 0$	$\phi(x, \lambda) = \sin(\lambda x)$	$B(\lambda) = \frac{2}{\pi} \int_0^\infty f(x) \sin(\lambda x) dx$ $f(x) = \int_0^\infty B(\lambda) \sin(\lambda x) d\lambda, \quad 0 < x$
$\phi'' + \lambda^2 \phi = 0, 0 < x$ $\phi'(0) = 0$ $\phi(x)$ bounded as $x \rightarrow \infty$			
$\phi'' + \lambda^2 \phi = 0, -\infty < x < \infty$ $\phi(x)$ bounded as $x \rightarrow \pm\infty$			