NAU
NORTHERN ARIZONA UNIVERSITY

Department of Mathematics and Statistics
Colloquium
Tuesday February 4
AMB 164 4:00 -5:00 pm

Generalized Eigenvectors and Sturm-Liouville Eigenfunctions

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Abstract

This talk introduces two eigenvalue problems.

(1) The generalized eigenvalue problem: Given square matrices A and B, find all pairs $(\lambda, \mathbf{v})$ that satisfy

$$A\mathbf{v} = \lambda B\mathbf{v}.$$

(2) The Sturm-Liouville eigenvalue problem: Given functions p, q, and σ with domain $[a, b]$, find all pairs (λ, ϕ) that satisfy

$$\frac{d}{dx}\left(p(x)\frac{d\phi}{dx}\right) + q(x)\phi + \lambda\sigma(x)\phi = 0$$

along with boundary conditions, *e.g.* $\phi(a) = \phi(b) = 0$.

We show that a finite difference approximation for a Sturm-Liouville problem yields a generalized eigenvalue problem. The only prerequisite for this talk is Linear Algebra, MAT 316.

Refreshments at 3:45