SPECTRAL REPRESENTATION OF TWO-POINT DIFFERENTIAL OPERATORS

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Augmented eigenfunctions are a class of spectral functionals which have been shown to be useful in expressing solutions of initial-boundary value problems [FS15, PSss, Smi14]. This is particularly important in the case where the spatial differential operator is degenerate irregular in the sense of Locker [Loc08], as no other effective solution representation is known. They also provide a spectral theorem where the inverse of the operator is diagonalized.

Open problems:

(1) Are there other applications for augmented eigenfunctions?
(2) Can a spectral theory be developed using augmented eigenfunctions?

References

[FS15] A. S. Fokas and D. A. Smith. Evolution PDEs and augmented eigenfunctions. I finite interval. arXiv:1303.2205 `http://arxiv.org/abs/1303.2205`, 2015.

[Loc08] J. Locker. Eigenvalues and completeness for regular and simply irregular two-point differential operators. *Mem. Amer. Math. Soc.*, 195(911):viii+177, 2008.

[PSss] B. Pelloni and D. A. Smith. Evolution PDEs and augmented eigenfunctions. II half line. *J. Spec. Theory*, 2015 (in press).

[Smi14] D. A. Smith. The unified transform method for linear initial-boundary value problems: a spectral interpretation. arXiv:1408.3659, `http://arxiv.org/abs/1408.3659`, 2014.

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