

A CLASS OF EVOLUTIONARY OPERATORS AND ITS APPLICATIONS TO ELECTROSEISMIC WAVES IN ANISOTROPIC, INHOMOGENEOUS MEDIA

DES MCGHEE AND RAINER PICARD

Abstract. In the framework of a comprehensive theory for a new class of evolutionary problems wellposedness of associated initial boundary value problems is considered. The dynamic linear model for electroseismic waves in anisotropic, inhomogeneous, time-shift invariant media is used as an illustration of the theory.

Mathematics subject classification (2010): 37L05, 58D25, 74F15, 74F10, 74D05, 86A15.

Keywords and phrases: electroseismic waves, poro-elastic media, memory.

REFERENCES

- [1] J. FRENKEL, *On the theory of seismic and seismoelectric phenomena in a moist soil*, Journal of Engineering Mechanics-ASCE, 131:879–887, 2005.
- [2] J. F. LU AND A. HANYGA, *Wave field simulation for heterogeneous porous media with singular memory drag force*, Journal of Computational Physics, 208:651–674, 2005.
- [3] R. PICARD, *Hilbert Space Approach to Some Classical Transforms*, Pitman Research Notes in Mathematics Series, 196, Harlow: Longman Scientific & Techn. New York: John Wiley & Sons, Inc. 203 p., 1989.
- [4] R. PICARD, *On a class of linear material laws in classical mathematical physics*, Int. J. Pure Appl. Math. 50, No. 2, 283–288, 2009.
- [5] R. PICARD AND S. SEIDLER, *On asymptotic equipartition of energy*, J. Differ. Equations, 68:198–209, 1987.
- [6] RAINER PICARD, *A structural observation for linear material laws in classical mathematical physics*, Math. Methods Appl. Sci., 32(14):1768–1803, 2009.
- [7] S. R. PRIDE AND S. GARAMBOIS, *Electroseismic wave theory of Frenkel and more recent developments*, Journal of Engineering Mechanics-ASCE, 131:898–907, 2005.
- [8] S. R. PRIDE AND M. W. HAARTSEN, *Electroseismic wave properties*, Journal of The Acoustical Society of America, 100:1301–1315, 1996.
- [9] STEVEN R. PRIDE, *Governing equations for the coupled electromagnetics and acoustics of porous media*, Phys. Rev. B, 50(21):15678–15696, Dec 1994.
- [10] STEVEN R. PRIDE, *The electroseismic wave theory of Frenkel*, LBNL-54075, Lawrence Berkeley National Laboratory, Nov 2003. ID: 212647401.