

**Straughan, B.; Walker, D. W.**

**Two very accurate and efficient methods for computing eigenvalues and eigenfunctions in porous convection problems.** (English) [Zbl 0858.76064](#)

*J. Comput. Phys.* 127, No. 1, 128-141 (1996).

Summary: We develop the compound matrix method and the Chebyshev tau method to be applicable to linear and nonlinear stability problems for convection in porous media, in a natural way. It is shown how to obtain highly accurate answers to problems which may be stiff, and spurious eigenvalues are avoided. A detailed analysis is provided for a porous convection problem of much current interest, namely convection with a horizontally varying temperature gradient.

**MSC:**

- 76M25 Other numerical methods (fluid mechanics) (MSC2010)
- 76E15 Absolute and convective instability and stability in hydrodynamic stability
- 76E30 Nonlinear effects in hydrodynamic stability
- 76S05 Flows in porous media; filtration; seepage
- 65N35 Spectral, collocation and related methods for boundary value problems involving PDEs
- 80A20 Heat and mass transfer, heat flow (MSC2010)

Cited in **26** Documents

**Keywords:**

compound matrix method; Chebyshev tau method; spurious eigenvalues; horizontally varying temperature gradient

**Software:**

LAPACK

**Full Text:** [DOI](#)