

LATTICE MODELS AND THEIR USE IN MULTISCALE PROBLEMS

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Lattices appear in many engineering applications, ranging from light-weight structures to nano-scale photonic devices. Due to their simple microstructure, lattices are ideal for exploring relationships among discrete, continuum, and quasi-continuum models.

In this presentation, we will address the following topics:

- Lattice Green's functions and their connections with continuum Green's functions and homogenization [1].
- Formulation and numerical treatment of Boundary Algebraic Equations [2]. These equations can be regarded as a discrete analogue of Boundary Integral Equations.
- Applications to multiscale problems. Here in addition to considering specific problems [3,4], we outline a method for deriving boundary conditions for molecular dynamic models.

The unifying theme for these topics is that lattice models can be advantageous in comparison to the corresponding continuum models, particularly in multiscale problems.

References

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