

Spectral Galerkin Method For Solving Dynamic Stochastic Games

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Abstract: In this paper we propose a spectral Galerkin method for solving the simultaneous functional equations that occur in dynamic stochastic games. The linear-quadratic (LQ) approximation can be used as a numerical method for solving these equations. The spectral Galerkin method is a special case of the so-called weighted residual methods, commonly used in computational physics for solving partial differential equations. This method leads to very simple solutions with minimal computational effort.

Key words: Spectral galerkin method • Dynamic stochastic games • Linear-quadratic • Weighted residual method

INTRODUCTION

The literature about dynamic game theory applied to capital accumulation and income distribution in the tradition of the Lancaster model grew extensively during the eighties. For example, the original result that its equilibrium was inefficient rested on the solution concept

Consider a stationary discrete-time infinite horizon game in which two firms produce two goods that are close substitutes. The goods are infinitely perishable, which eliminates a possibility of carryover. As an illustration, one may think of two bakeries across the street from each other, one bakes only donuts, the other bakes only bagels. While each consumer prefers either bagels or