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Insuring wind energy production

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Abstract

This paper presents an insurance contract that the supplier of wind energy may subscribe in order to immunize the production of electricity against the volatility of the wind speed process. The other party of the contract may be any dispatchable energy producer, like gas turbine or hydroelectric generator, which can supply the required energy in case of little or no wind. The adoption of a stochastic wind speed model allows the computation of the fair premium that the wind power supplier has to pay in order to hedge the risk of inadequate output of electricity at any time. Recursive type equations are obtained for of the prospective mathematical reserves of the insurance contract and for their higher order moments. The model and the validity of the results are illustrated through a numerical example.

Keywords: wind speed, prospective reserve, fair premium, semi-Markov chain
2000 MSC: 91B76, 91B30, 60K15

1. Introduction

Renewable energies are assuming even more importance in the production of electricity, especially wind energy. The share of production due to wind is continuously increasing in time although there are still relevant problems that affect this industry. The most important limitation for a further development of the wind energy industry probably concerns the variability of the

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