

Jump-Diffusion Models for the Generation Rate in the Pricing of Renewable Energy Certificates (RECs)

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Abstract

Although international organizations and countries acknowledge the benefits of renewable energy, the deployment of the related technologies usually requires large investments. So, additional market tools have been created to foster their developments. In particular, Renewable Energy Certificates (RECs), also known as green bonds, which gratify the obtention of electricity from renewables, have been designed and are currently traded in energy markets.

In this work, we extend previous PDEs based models for the pricing of RECs to the case where the generation rate of the renewable follows a jump-diffusion model. More precisely, in [1] a nonlinear PDE model is obtained when the generation rate and number of RECs are considered as underlying factors. Moreover, suitable numerical methods have been proposed in [1, 2] to solve this model. The inclusion of jumps in the stochastic dynamics of the generation rate leads to a nonlinear PIDE model, with an additional nonlocal (integral) term with respect to the PDE model. In the present work, we also propose suitable numerical methods for the treatment of this term based on [4]. Numerical examples with data taken from [3] illustrate the behaviour of the model and the numerical methods.

References

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