

Accepted Manuscript

A numerical strategy for telecommunications networks capacity planning under demand and price uncertainty

Iñigo Arregui, Beatriz Salvador, Carlos Vázquez

PII: S0377-0427(16)30036-X

DOI: <http://dx.doi.org/10.1016/j.cam.2016.01.056>

Reference: CAM 10493

To appear in: *Journal of Computational and Applied Mathematics*

Received date: 24 July 2015

Revised date: 18 January 2016



Please cite this article as: I. Arregui, B. Salvador, C. Vázquez, A numerical strategy for telecommunications networks capacity planning under demand and price uncertainty, *Journal of Computational and Applied Mathematics* (2016), <http://dx.doi.org/10.1016/j.cam.2016.01.056>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A numerical strategy for telecommunications networks capacity planning under demand and price uncertainty

Iñigo Arregui, Beatriz Salvador, Carlos Vázquez

*Dpto. de Matemáticas, Universidade da Coruña, Campus de Elviña, s/n,
15071 A Coruña, Spain*

Abstract

The massive use of Internet in the last twenty years has created a huge demand for telecommunications networks capacity. In this work, financial option pricing methods are applied to the problem of network investment decision timing. The main innovative aspect is the consideration of two uncertain factors: the capacity demand and the bandwidth price, the evolution of which are modeled by suitable stochastic processes. Thus, we consider the optimal decision problem of upgrading a line in terms of the (highly volatile) uncertain demand for capacity and the price. By using real options pricing methodology, a set of partial differential equation problems are posed and appropriate numerical methods based on characteristics methods combined with finite elements to approximate the solution are proposed. The combination with a dynamic programming strategy gives rise to a global algorithm to help in the decision of optimizing the value of the line.

Keywords: Telecommunications networks planning, real options pricing, numerical methods, decision making

1. Introduction

Financial valuation of telecommunication networks, such as Internet and dark fiber networks, is a relevant current subject, as these kinds of infrastructure are the object of important trading activities and companies have to make large investments on them. When the infrastructure starts to operate, an important question is to price it as an asset that will generate revenues in future dates depending on the future market uncertainty. Different approaches have been made to this interesting problem in a telecom-

Download English Version:

<https://daneshyari.com/en/article/5776447>

Download Persian Version:

<https://daneshyari.com/article/5776447>

[Daneshyari.com](https://daneshyari.com)