

# Finite Differences for Pricing Financial Instruments

New York 22 & 23 February 2001

Speaker

**Domingo Tavella**

The founder and Chief Editor of the *Journal of Computational Finance* and pioneer of the application of advanced finite difference techniques to financial pricing and co-author of the first comprehensive book on the subject.

**At this intensive and hands-on course you will learn how to:**

- deal with numerical issues well beyond the typical Black-Scholes equation, such as path dependency, discrete exercise, and credit events
- judge and understand the suitability of discretization schemes, including the ability to design your own schemes
- transform your tree-pricing infrastructure into a powerful pricing engine, especially effective in fixed income applications
- put theory into practice – transform your starter pricing kit into a sophisticated module you can implement using your own systems
- implement more complex schemes to resolve some of the issues presented by standard schemes

**All delegates will receive**

A FREE copy of the book co-authored by Domingo Tavella - *"Pricing Financial Instruments: The Finite Difference Method"* - worth US\$79.95.  
A C++ starter kit for building your own finite differences pricing system.  
Reading materials that expand on the topics discussed during the course.

Endorsed by:



FINANCIAL  
ENGINEERING  
NEWS

Official publication:

THE JOURNAL OF  
**D**ERIVATIVES

To register: telephone +415 282 6133 or email [register@octanti.com](mailto:register@octanti.com)

## DAY ONE

Thursday 22 February 2001

### MORNING SESSION 9am-12.30pm

To profit optimally from the power of finite differences, the first step is to set up your pricing equation properly in the form of a partial differential equation. In this session you will learn how to deal with issues well beyond the typical Black-Scholes equation, such as path dependency, discrete exercise, and credit events. You will also learn how to judge and understand the suitability of discretization schemes, including the ability to design your own schemes and how to transform your tree-pricing infrastructure into

a powerful pricing engine, especially effective in fixed income applications.

### Derivation of the pricing equations

- Strategies for path dependency
- Dimensionality reduction
- Derivatives subject to jumps
- Complex fixed income structures
- Credit derivatives
- Hedging parameters

### Analysis and design of finite differences for financial pricing

- Error, stability, distortion, and convergence
- Techniques for increasing performance
- Analysis of specific algorithms
- Role and impact of coordinate transformations



With his wealth of expertise drawn from over 20 years in business, academia and as an author together with his experience of speaking at 100+ conferences and at numerous public engagements in computational finance and risk management in the US and abroad, **Domingo Tavella** is uniquely qualified to lead this course on **Finite Differences for Pricing Financial Instruments**.

Domingo's most significant achievements are that he pioneered both the emergence of Computational Finance as an independent discipline and the application of advanced finite difference techniques to financial pricing. He also:

- co-wrote *"Pricing of Financial Derivatives: The Finite Difference Method"* (Wiley & Sons)
- was the founder and is Chief Editor of the Journal of Computational

# Finite Differences for Pricing Financial Instruments

NEW YORK 22 & 23 February 2001

## Solution strategies with finite difference methods in finance

- Payoffs and discontinuities
- Boundary conditions
- Accuracy versus speed
- Treating path dependency
- Continuous versus discrete sampling
- Dealing effectively with jumps
- Dealing with early exercise: theory versus practice
- Using finite differences to improve on the design of trees
- Using finite differences to empower fixed income lattices

## AFTERNOON SESSION 2pm-5.30pm

Here you will learn how to put theory into practice. After a discussion on the practical design of finite difference codes for finance applications, you will

learn how to transform your starter pricing kit into a sophisticated module that you can then implement using your own systems.

## Implementation strategies for finite difference methods in finance

- Code architecture and effective object design
- Applying finite difference methods to existing tree infrastructures
- Enhancing code performance

## Practical implementation of a system for finite differences pricing

- Evolving your starting kit into a complex system
- Integrating your C++ code with spread sheets
- Practical use of COM objects for inter-applications communication

Speaker

**Domingo Tavella**

Finance (Risk Waters Group), the highly-respected benchmark for state-of-the-art quantitative finance for practitioners and academics worldwide

- designed some of the fastest and most flexible risk systems on the market
- pioneered the development of dynamic financial analysis based risk systems for insurance applications
- pioneered the introduction of distributed supercomputing to finite difference algorithms in large-scale applications.

In addition, he will shortly be teaching the course on computational methods for derivatives pricing at the new Financial Engineering Program at UC Berkeley.

Domingo is currently the principal of Octanti Associates, a consulting firm

To register: telephone +415 282 6133 or email [register@octanti.com](mailto:register@octanti.com)

## DAY TWO

Friday 23 February 2001

Day two will consist entirely of hands-on case studies that will be structured in increasing order of difficulty. You will use the library kit provided with the course, and will apply the connectivity ideas discussed in day one through a series of clearly defined modules.

### MORNING SESSION 9am-12.30pm

In this session you will learn the minutiae of implementing more complex schemes to resolve some of the issues presented by standard schemes. You will deal extensively with alternative approaches to early exercise and

path-dependency and their software design consequences.

### Numerical issues case studies

- Practical implementation of multi-level schemes
- Alternative implementations of linear complementarity
- Implementation of a variety of path-dependency cases

### AFTERNOON SESSION 2pm-5pm

Finally, you will put into practice the knowledge you have acquired into an essential pricing system complete with its main components. You will develop, from start to finish, a sufficiently complex case study involving path dependency, jumps, and early exercise.

with offices in San Francisco, California, and Munich, Germany, specialising in computational finance, risk software systems design, and risk strategies for financial institutions and insurance. He is also advisor to major financial institutions and insurance firms in the US and Europe on computational finance and strategic risk management issues and to leading financial software firms on the development of advanced financial applications and strategic product positioning.

Prior to this he was: Director of Financial Engineering, Integral Development Corporation; Vice President, Bankers Trust New York; Financial Engineering Manager, LOR-Geske Bock Associates; and Senior Computer Scientist at NASA's Ames Research Center, California as well as spending over ten years as a university instructor in business and engineering.

Domingo gained his PhD in Aeronautical Sciences at Stanford University and his MBA Finance at UC Berkeley.

# Finite Differences for Pricing Financial Instruments

New York 22 & 23 February 2001

**Finite Differences for Pricing Financial Instruments** will give you the opportunity to learn how to implement more complex schemes to resolve some of the issues presented by standard schemes for pricing derivatives and complex financial instruments. It will concentrate on finite differences as an alternative method, particularly their practical application and benefits. Problems will be identified and solutions offered.

There will be case studies in which you will participate to give you the opportunity to put theory into practice. These will include building your own finite differences pricing system using the C++ starter kit (a finite differences software library) provided free with the course.

## Who should attend

This course has been designed specifically for individuals in banks such as:

- Head of research
- Director of quantitative research
- Head of fixed income research
- Quants with knowledge of finite differences as applied in other disciplines
- Anyone whose role includes the pricing of derivatives and complex financial instruments.
- Risk controls specialist
- Risk management researchers
- Financial engineers

Those who will benefit most from this course will be familiar with the basics of asset pricing theory and the fundamentals of linear algebra. Previous knowledge of finite differences is helpful but not essential. This course will be particularly helpful to sophisticated analysts with previous experience in finite differences in other disciplines, such as physics or applied mathematics.

Pre-course reading will be given out to ensure that all delegates will start the course with a sound basis in finite differences from which to work.

## About the endorser

**The International Association of Financial Engineers (IAFE)** is a professional society dedicated to defining and fostering the profession of financial engineering. Its primary mission is to help establish and promote industry standards and practices relating to financial engineering theory and practice. Founded in 1992, the IAFE has grown to include nearly 2,000 members worldwide representing practitioners, academics, and students from many financial disciplines as well as professionals from the accounting, legal, regulatory, and technology communities.

## About the official publication

Published by Institutional Investor, Inc., The Journal of Derivatives (JOD) is the leading practitioner-focused journal to bridge the gap between academic theory and practical application in this complex, evolving field. With concise, results-oriented analysis from the biggest names in the business - top industry professionals and academics - JOD probes current strategies, developments and pricing models. To get a RISK-FREE TRIAL copy of JOD, call (212) 224-3800, fax (212) 224-3472 or email [info@ijournals.com](mailto:info@ijournals.com).

## About the organisers

This course was organised by Hughes Martin: the Pow Wow company.  
Telephone +44 (0)1276 671043 or visit [www.hughesmartin.co.uk](http://www.hughesmartin.co.uk).

To register: telephone +415 282 6133 or email [register@octanti.com](mailto:register@octanti.com)

# Finite Differences for Pricing Financial Instruments

## New York 22 & 23 February 2001

Code: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

### REGISTRATION DETAILS

Please complete in BLOCK CAPITALS

TITLE	FIRST NAME	FAMILY NAME
JOB TITLE / POSITION	DEPT	
COMPANY		
ADDRESS		
	CITY	
POST/ZIPCODE	COUNTRY	
TELEPHONE	FAX	EMAIL

I would like to attend **Finite Differences for Pricing Financial Instruments New York 22 & 23 February 2001 - US\$2,499**

In addition to your free gifts, the registration fee includes breakfast, lunch, refreshments and your documentation pack. However, the registration fee does not include the provision of computers therefore, all delegates will be required to provide their own lap tops.

As a delegate I would like to claim my free:

- copy of the book **"Pricing Financial Instruments: The Finite Difference Method"** - worth US\$79.95 *(list price, correct at time of going to press)*
- C++ starter kit for building my own finite differences pricing system
- reading materials that expand on the topics discussed during the course

### PAYMENT DETAILS

Payment is required prior to the course.

- I enclose a cheque payable to Octantit Associates.
- Please invoice me/my organisation. I require an original/fax copy *(please delete as appropriate)*.
- I will be paying by bank transfer - please provide bank details *(please allow a minimum of seven working days for a bank transfer to reach us and phone or fax us when it has been sent, also state the event name and delegate name to which it relates)*.
- Please debit my:  VISA  MASTERCARD *(please supply billing address if different from above)*

CARD NO: \_\_\_\_\_ EXPIRY DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

**Discounts:** A discount of 15% will be given for booking three or more delegates from the same department on to this course.  
**Cancellations/substitutions:** All cancellations must be made in writing. If a cancellation is received more than fourteen business days before the course, a full refund, less an administration fee of 10% + VAT, will be given. Cancellations received between ten and fourteen business days before the course will be entitled to a 50% refund. Regrettably, no refunds can be made for cancellations received less than ten days prior to the course. Delegates can be substituted at any time prior to the event - please notify us before the course.  
 From time to time we make parts of our mailing list available to carefully selected organisations whose products may be of interest to you. If you would prefer not to receive such mailings, please tick this box.

### VENUE

**Hilton Times Square,  
 234 West 42nd Street,  
 New York, NY 10036  
 Tel +212 840 8222**

### VISIT OUR WEBSITE

**www.octanti.com**

### TO REGISTER

**Tel +415 282 6133  
 Email register@octanti.com  
 Mail Octanti Associates  
 113 Valley Street,  
 San Francisco  
 California, CA 94131,  
 USA  
 Fax +415 282 6253**

code: OCT001