

Technical Note No. 16\*  
Options, Futures, and Other Derivatives, Ninth Edition  
John Hull

**Construction of an Interest Rate Tree with  
Non-Constant Time Steps and Non-Constant Parameters**

Consider a one-factor model of the form

$$df(r) = [\theta(t) - a(t)f(r)] dt + \sigma(t) dz$$

As in Section 31.7 we let  $x = f(r)$  and first build a tree for the process

$$dx = -a(t)x dt + \sigma(t) dz$$

The procedure for doing this is given in Technical Note 9. We then convert this tree to a tree for the process

$$dx = [\theta(t) - a(t)x] dt + \sigma(t) dz$$

so that the zero curve is fitted using the approach given in Section 31.7. For more details see “The Generalized Hull–White Model and Supercalibration,” *Financial Analysts Journal*, 57, 6, Nov-Dec, 2001. The article is also available on John Hull’s website.

---

\* ©Copyright John Hull. All Rights Reserved. This note may be reproduced for use in conjunction with Options, Futures, and Other Derivatives by John C. Hull.