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My Life as a Quant

Reflections on Physics and Finance

Emanuel Derman

John Wiley & Sons, Inc.
To the Memory of My Parents
Ambition is a state of permanent dissatisfaction with the present.
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The Two Cultures

Physics and finance  What quants do  The Black-Scholes model  Quants and traders  Pure thought and beautiful mathematics can divine the laws of physics  Can they do the same for finance?

MODELING THE WORLD

If mathematics is the Queen of Sciences, as the great mathematician Karl Friedrich Gauss christened it in the nineteenth century, then physics is king. From the mid-seventeenth century to the end of the nineteenth, Newton's Law of Gravitation, his three Laws of Motion, and his differential calculus described with apparent perfection the mechanical motion of objects in our world and the solar system.

In 1864, two hundred years after Newton, the Scottish physicist James Clerk Maxwell formulated the compact and elegant differential equations that described with similarly astounding precision the propagation of light, X-rays, and radio waves. Maxwell's equations showed that electricity and magnetism, formerly separate phenomena, were part of the same unified electromagnetic field.

We cannot simply look at the world around us and deduce Newton’s Laws or Maxwell’s equations. Data on its own does not speak. These equations were triumphs of the mind, abstracted from the world in