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Valuation of Barrier Option by Simulation

Financial Mathematics | Option pricing | the Monte Carlo method

Finding a price of barrier options is the goal of thesis. The Monte Carlo approach to pricing is implemented. The program in the case of an option with two barriers, when the payoff is determined by user, was created.

Why barrier options?

They are most popular forms of exotic options, because of payoff opportunities are more limited, they are cheaper to buy than European options.

What is the problem?

The pricing of financial derivatives is of basic importance in practice because of at least one reason: financial institutions need to know the theoretical price when creating new financial products.

In order to find the theoretical price for double barrier options we need to derive equations for the Laplace transform and then to invert one, using contour integration. Indeed it is not a simple. That is why to resort to numerical methods is preferably. In this thesis we solve the pricing problem by the Monte Carlo method.

Solution and results

Before applying the Monte Carlo approach we made the comparison between the simulated and theoretical prices for options witn one barrier. The results were satisfactory and then we used this method for the double barrier options.

Conclusion

1. We have created a program to use the Monte Carlo valuation of double barrier options for arbitrary payoff-function.
2. We checked these results for a special case, namely Double Knock-Out Call Option. For the latter option theoretical results were obtained before.