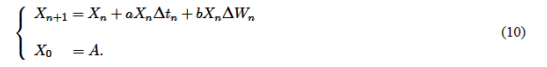
**a.1** Set proper project additional directories: Open Project->Properties->C/C++->General and add the Boost and UtilitiesDJD to Additional Include Directories.

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描述已自动生成

**a.2** Analysis of the code: in SDEDefinition, the drift, diffusion and diffusionDerivative are defined.



The above equation becomes

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In drift function, X := , data->r:=r.

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In diffusion and diffusionDerivative function, data->sigma:=, X := . And becomes a constant k=T/(Number of subintervals), is simulated by the standard normal random variable.

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In the end, the option price is computed by discounted average of the payoff of European option in simulated underlying price.

b.1



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | N | NSIM | Call | Put |
| Batch 1 | 100 | 10, 000 | 2.11232 | 5.90807 |
| 100 | 1,000, 000 | 2.13271 | 5.85125 |
| 1000 | 10, 000 | 2.10759 | 5.93793 |
| 1000 | 1,000, 000 | 2.14885 | 5.83585 |

b.2



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | N | NSIM | Call | Put |
| Batch 2 | 400 | 10, 000 | 7.87596 | 8.09741 |
| 400 | 1,000, 000 | 7.92079 | 8.01235 |
| 4000 | 10, 000 | 7.90923 | 8.01125 |
| 4000 | 1,000, 000 | 7.95996 | 7.96001 |

Based on the knowledge of probability, we know the standard deviation of MC of European Option is decreasing with the increasing of NSIM. After the experiment, I selected 100,000 as the proper NSIM. At the same time, with the decreasing of subinterval length, the MC become more accurate, which 1,000 is a good choice.

c



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | N | NSIM | Call | Put |
| Batch 4 | 100 | 10, 000 | 89.77803 | 1.30057 |
| 100 | 100, 000 | 91.20519 | 1.26065 |
| 4000 | 10, 000 | 91.01456 | 1.25099 |
| 4000 | 1,000, 000 | 91.19216 | 1.24805 |

I found the key is not N but T/N, so I changed the corresponding ratio to get 2 decimal accuracy. But it’s quite difficult to get the 2 decimal precision in Call option, even I extended the N to 4000, NSIM to 1,000,000.