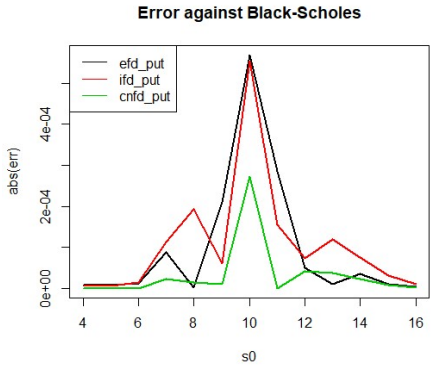
Computational Finance P7
Spring 20
Minqi Tan

1. i) European Put values using the three methods:

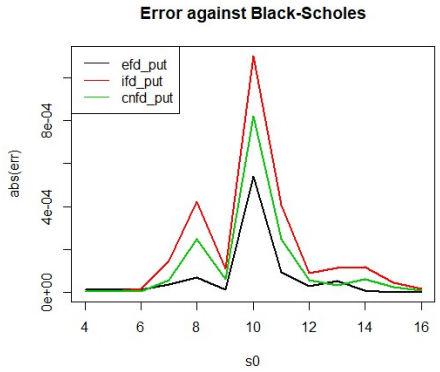
	EFD	IFD	CNFE
Sig*sqrt(dt)	0.4641262	0.4641415	0.4644212
Sig*sqrt(3dt)	0.4641527	0.4635921	0.4638726
Sig*sqrt(4dt)	0.4638783	0.4633168	0.4635977

ii) As we can see in below graphs, when dx is small, Crank-Nicolson Method performs better, with relatively small absolute errors against BS Model. As dx increases, the Explicit Finite-Difference method becomes better.

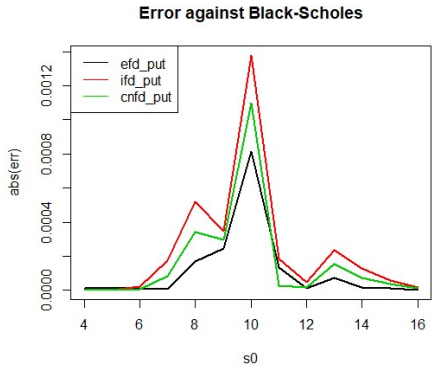
dx= Sig*sqrt(dt):



dx= Sig*sqrt(3dt):



dx= Sig*sqrt(4dt):



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2. i) Values of American Calls and Puts using the three methods:

Calls:

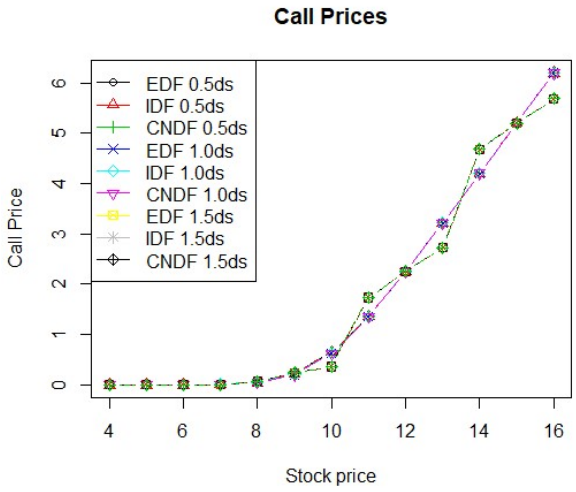
	EFD	IFD	CNFE
0.5ds	0.6540398	0.6534358	0.6537381
1.0ds	0.6230464	0.6222901	0.6226689
1.5ds	0.3622997	0.3620079	0.3621546

Puts:

	EFD	IFD	CNFE
0.5ds	0.4733277	0.4724533	0.4728893
1.0ds	0.4399789	0.4390812	0.4395300
1.5ds	0.6925425	0.6921732	0.6923577

ii) Graphs:

American Calls:



American Puts