Financial Mathematics

MATH 5870/6870[1]
Fall 2021

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Last updated on

August 9, 2021

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[1] Based on Robert L. McDonald's *Derivatives Markets*, 3rd Ed, Pearson, 2013.

Chapter 9. Parity and other option relationships

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European versus American options

$$C_{\mathrm{Amer}}(S, K, T) \geq C_{\mathrm{Eur}}(S, K, T)$$

$$P_{\mathrm{Amer}}(S, K, T) \geq P_{\mathrm{Eur}}(S, K, T)$$

Maximum and minimum option prices

$$S \geq C_{\mathrm{Amer}}(S, K, T) \geq C_{\mathrm{Eur}}(S, K, T) \geq \max\left(0, \mathrm{PV}_{0,T}(F_{0,T}) - \mathrm{PV}_{0,T}(K)\right)$$

$$K \geq P_{\mathrm{Amer}}(S, K, T) \geq P_{\mathrm{Eur}}(S, K, T) \geq \max\left(0, \mathrm{PV}(K) - \mathrm{PV}_{0,T}(F_{0,T})\right)$$

Early exercise for American options

$$C_{\mathrm{Amer}} \geq C_{\mathrm{Eur}} > S_t - K$$

$$K - \mathrm{PV}_{t,T}(K) > \mathrm{PV}_{t,T}(\mathrm{Div})$$

See p. 277 for the proof of the first set of inequalities.

Unfinished...