
2. Suppose that you have a portfolio $P$ with $\Delta_P = 2$, $\Gamma_P = 3$ and $\nu_P = 4$ ($\nu$ is the Vega). Assume the Black-Scholes model.
You want to be delta- and vega-neutral. Suppose you could trade the underlying stock and (European) put options. Prove that you must short some of the puts. If you only shorted the puts, what, if anything, can you say about your trading strategy for the stock?
Repeat this problem replacing puts with (Euro) calls.

3. Consider the portfolio from the previous problem.
You can trade the underlying stock as well as three claims: $A, B, C$. You know that $\Delta_A = 1$, $\Gamma_A = 2$, $\nu_A = 3$ $\Delta_B = 4$, $\Gamma_B = 5$, $\nu_B = 6$ $\Delta_C = 7$, $\Gamma_C = 7$, $\nu_C = 7$.
You want to be delta-, gamma- and vega-neutral. Prove that you cannot do this without trading the stock. How can you do this trading the stock, claim $A$ and claim $B$?