A few words of explanation about the code - we are trying to implement the formula for the basket call given by

$$(1) \qquad c(K) = K * \left[\sum_{j=1}^{N} S_j(0) - e^{-rT} - \frac{e^{-rT}}{(2\pi)^N} \int_{\mathbb{R}^N + i\alpha} e^{i\xi \cdot X_0} \Phi(\xi, T) \widehat{P}(\xi) d\xi \right],$$

where

$$X_0 = (\log S_1(0), \ldots, \log S_N(0)),$$
$$\widehat{P}(\xi) = \frac{\prod_{j=1}^{N} \Gamma(-i\xi_j)}{\Gamma(-i(\sum_{j=1}^{N} \xi_j) + 2)},$$

and

$$\Phi(\xi, T) = \exp\left[i\xi \cdot v(r, \sigma, T) - (\Sigma\xi \cdot \xi)T/2 \right],$$

where the vector v is given by

$$v(r, \sigma, T) = (rT - \sigma_1^2 T/2, \ldots, rT - \sigma_N^2 T/2),$$

and the symmetric matrix Σ is given by

$$\Sigma = \begin{pmatrix} \sigma_1^2 & \sigma_1\sigma_2\rho_{12} & \cdots & \sigma_1\sigma_N\rho_{1N} \\ \sigma_1\sigma_2\rho_{12} & \sigma_2^2 & \cdots & \sigma_2\sigma_N\rho_{2N} \\ \vdots & \ddots & \ddots & \vdots \\ \sigma_1\sigma_N\rho_{1N} & \sigma_2\sigma_N\rho_{2N} & \cdots & \sigma_N^2 \end{pmatrix}.$$

Here ρ_{ij} are the correlation coefficients. The part I can't implement in C++ is this simple matrix multiplication - also, I don't know whether we can write a function that has a matrix as an argument (I'm sure there's a way around this, but certainly we can't use array). See if you can modify my code in an appropriate way.