Quantitative Finance > Computational Finance

Fast Correlation Greeks by Adjoint Algorithmic Differentiation

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We show how Adjoint Algorithmic Differentiation (AAD) allows an extremely efficient calculation of correlation Risk of option prices computed with Monte Carlo simulations. A key point in the construction is the use of binning to simultaneously achieve computational efficiency and accurate confidence intervals. We illustrate the method for a copula-based Monte Carlo computation of claims written on a basket of underlying assets, and we test it numerically for Portfolio Default Options. For any number of underlying assets or names in a portfolio, the sensitivities of the option price with respect to all the pairwise correlations is obtained at a computational cost which is at most 4 times the cost of calculating the option value itself. For typical applications, this results in computational savings of several order of magnitudes with respect to standard methods.

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