

## **CreditRisk<sup>+</sup> by Fast Fourier Transform**

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### **ABSTRACT**

In this paper, we focus on the methodology applied in the CreditRisk<sup>+</sup> Technical Document. Its *Appendix A* gives analytical explanations of the technique used to generate the loss distribution arising from a credit portfolio. It is worth mentioning that although underlying concepts are easy to grasp for those with an intermediate mathematical knowledge, the technical methods employed in this paper may not be straightforward for those who are not fully familiar with the mathematics employed.

First, we concentrate on the concepts of the Probability Generating Function and Convolution, and their application in CreditRisk<sup>+</sup>. Then, we explain, in practical terms, the use of the recurrence relation used by CreditRisk<sup>+</sup>. Last, we develop an alternative way to calculate CreditRisk<sup>+</sup> through the Fast Fourier Transform ( FFT ). In order to cover the gap between the theory and its practical implementation we provide VBA, MatLab and R codes that present step-by-step all the practical applications covered.

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