

A new and efficient method for the computation of Legendre coefficients

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An efficient procedure for the computation of the coefficients of Legendre expansions is here presented. We prove that the Legendre coefficients associated with a function $f(x)$ can be represented as the Fourier coefficients of an Abel-type transform of $f(x)$. The computation of N Legendre coefficients can then be performed in $O(N \log N)$ operations with a single Fast Fourier Transform of the Abel-type transform of $f(x)$.

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