P-9: On the momentum representation of the spinor components of relativistic eigenfunctions and the Fourier transformation of their multiple products for hydrogen-like atoms

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An approach to calculate the Fourier transformations of the spinor components of relativistic eigenfunctions for hydrogen-like atoms as well as the Fourier transformations of the multiple products of these components is developed. The method simplifies calculations of the momentum representation for the eigenfunctions belonging to the discrete spectrum. Besides that it reduces the procedure of the Fourier transformation for the eigenfunctions belonging to the continuous spectrum to the evaluation of only one one-dimensional integral. The proposed algorithm seems to be especially convenient for extensive numerical calculations.