

## THE ANALYSIS OF DIGITAL IMAGES IN SCINTIGRAPHY OF HUMAN ORGANS

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In medical scintigraphy, the measured image represents a convolution of the distribution of radioisotopes in the organ with the response function of the detecting system. In addition, this image is subject to the statistical fluctuations generated by the random decay of radioisotopes. Here three methods of analysis are described. Their aim is to reconstruct the scintigrams by eliminating to some extent the effects of statistical fluctuations and the finite space resolution of the apparatus.

1) The method of Fourier analysis. In general, when processing scintigrams by Fourier method one gets a divergent Fourier series, the divergence being a consequence of the image fluctuations. By weighting the Fourier coefficients of such a series with a Fermi function or a Lanczos sigma-factor one obtains a convergent series<sup>(1,2)</sup>.

2) The difference method. A linear combination of the smoothed scintigram value and its first derivative can be used also to obtain a better contrast. The coefficients of the linear combination are determined from the value of the second derivative and the full width at half maximum of the response function<sup>(2)</sup>.

3) The momentum method. Here a new matrix is created from the measured one by associating to each element a parameter which is obtained by summing the values of nearby elements weighted with a factor of the form  $x^{-n}$ ,  $x$  being the distance between the nearby matrix element and the element for which the parameter is calculated,  $n$  is a positive number. Also this method results in a smoothed and contrasted representation of the original scintigram<sup>(2)</sup>.

## References

1. R.Hamming, Numericals methods for scientists and engineers, McGraw-Hill Book, 1962
2. B.Diallo, M.Erjavec, G.Kernel, S.Pahor, J.Šnajder, Komparacija metod digitalnega filtriranja (in press), 1976