

(u, v)], where $[H(u, v)]$ is the Hadamard matrix of order 64. Here, a weighting operation to $[G'(u, v)]$, is performed, and its result is transformed by means of the inverse Hadamard transformation. As a result, the high frequency components are moderately intensified and can be enhanced the true information

in RI image. It was confirmed that this image procedue was useful by applying to RI image of the liver phantome containing plastic cold bolle or liver image of 5 patients with hepato- toma. With this method, caluculation time was shorten in comparison with conventional methods for image processing.

RI Data Processing System for Nuclear Medicine (Report 14) Fourier Transform Compartmental Analysis in RI Tracer Kinetics

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Compartmental analysis has been in wide practical use for tracer kinetic studies using RI in biological system, because the data of radioactive process may be frequently represented by a linear combination of negative exponentials of the form :

$$f(t) = \sum_{i=1}^n A_i \exp(-\lambda_i \cdot t)$$

Here, n , A_i and λ_i represent a number of compartments, the initial size and decay constant of compartment i respectively

In this analysis, these parameters n , A_i and λ_i have biological or physical significance. To estimate them, peeling method has been widely used among several methods owing to simplicity of the procedure. For automatic analysis by computer, however, it has difficult problems to estimate an accurate straight line on a semilogarithmic plot due to large statistical errors in the tail of a decay curve.

Fourier transform method proposed by Gardner, is insensitive to small random errors. The result of the analysis by this method is shown in the form of a spectral graph in which a number of true peaks indicates that of compartments, and the abscissa value at the center of each peak represents the decay constant λ_i , while the height of the peak is proportional to A_i/λ_i .

Only a problem of this method is that "error ripples" due to the cutoff of the integral range, often obscure the true peaks. To improve S/N ratio, maximum likelihood method and maximum entropy method were applied to the frequency spectrum analysis.

The experiments using test functions and simulated data showed our method may possess certain advantage over previous methods of analysis and it was found to be useful for practical use.