

A FOURIER TRANSFORM WITH SPEED IMPROVEMENTS FOR  
MICROPROCESSOR APPLICATIONS

Donald C. Lokerson  
Goddard Space Flight Center  
Greenbelt, Maryland

and

Dr. Robert Rochelle  
University of Tennessee  
Knoxville, Tennessee

A fast Fourier transform algorithm for the RCA 1802 microprocessor has been developed for spacecraft instrument applications. The computations have been tailored for the restrictions an eight bit machine imposes.

The algorithm incorporates some aspects of Walsh function sequency to improve operational speed. This method uses a register to add a value proportional to the period of the band being processed before each computation is to be considered. If the result overflows into the "DF" register, the data sample is used in computation; otherwise computation is skipped. This operation is repeated for each of the 64 data samples. This technique is used for both sine and cosine portions of the computation.

The processing uses eight bit data but, because of the many computations that can increase the size of the coefficient, floating point form is used.

A method to reduce the alias problem in the lower bands will also be described.



