Forth Automates Intrinsic Viscosity Determinations

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ABSTRACT

An automated system for determination of the intrinsic viscosity of polymer samples has been implemented in the Analytical Laboratory at SOHIO.

Multi-tasking FORTH facilitated the implementation of the project and simplified software by enabling independent operation of the tasks. Conventional terminal mode tasks were used for the status display, operator interface, bar code printer and data storage on a remote computer system. Four additional tasks were responsible for control of, and data acquisition from, four viscometer tubes. All of these tasks share a single copy of the control and data acquisition software. Individual data buffers are used in each task to hold task specific information.

Timing for each channel was done in software rather than by individual real time clocks. The 1 KHz interrupt rate of the system's fixed period clock provided more than the required accuracy of 10 ms.

Report generation, calculations, plotting of data and data acquistion were accomplished with memory resident software on a 60 KB LSI-11/2 processor with a total hardware cost of $10,000. Vendor supplied operating systems would have required at least an LSI-11/23, 256 KB memory and a 20 MB disk system. These systems would have also required individual real time clocks for each channel to achieve the necessary timing accuracy. The cost of such a system would have been several times that of the FORTH based system.

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