APIC'95, El Paso, Extended Abstracts, A Supplement to the international journal of Reliable Computing

Connections between statistics, interval analysis and global optimization

G. William Walster

***Abstract*— There are a surprising number of connections between interval analysis and statistics. They include:**

- **Classical and Bayesian sample size computations, which require the interval computation of:**
    - **Central and Noncentral Cumulative Distribution Functions (CDFs) and Inverse CDFs for test statistics, including:**
        - **Gaussian,**
        - **t,**
        - **Gamma (Chi Square) and**
        - **Beta (F).**
- **Parameter estimation when closed form solutions do not exist.**
- **Algorithms that depend on representing measurement errors as intervals.**

To improve the performance of sample size computations, interval rational function approximations are needed for the various CDFs and their inverses. The functional equivalent of an interval Remez Exchange algorithm is required.

The author is a Manager with Fortran Compiler Technology, SunSoft, A Sun Microsystems Business, e-mail Bill.Walster@eng.sun.com.