

**Meeting:** 1003, Atlanta, Georgia, AMS CP 1, AMS Contributed Paper Session

1003-06-1628      **Alan Shuchat\*** ([ashuchat@wellesley.edu](mailto:ashuchat@wellesley.edu)), Department of Mathematics, Wellesley College, Wellesley, MA 02481, and **Randy Shull** and **Ann N. Trenk**. *The Fractional Weak Discrepancy of a Partially Ordered Set.*

We introduce the notion of the fractional weak discrepancy of a poset, building on previous work on weak discrepancy, e.g., Tanenbaum, Trenk, and Fishburn, *Order* 18 (2001), 201-225. The *fractional weak discrepancy*  $wd_F(P)$  of a poset  $P = (V, \prec)$  is the minimum nonnegative  $k$  for which there exists a function  $f : V \rightarrow \mathbf{R}$  satisfying (1) if  $a \prec b$  then  $f(a) + 1 \leq f(b)$  and (2) if  $a \parallel b$  then  $|f(a) - f(b)| \leq k$ . We formulate the fractional weak discrepancy problem as a linear program and show how its solution can also be used to calculate the (integral) weak discrepancy. We interpret the dual linear program as a circulation problem in a related directed graph and use this to give a structural characterization of the fractional weak discrepancy of a poset. (Received October 05, 2004)