1053-05-366 **Shaun P Sullivan*** (ssulli21@fau.edu), 2900 Olivewood Ter, O102, Boca Raton, FL 33431, and **Heinrich Niederhausen**. *Counting Strings in Ballot Paths.*

A ballot path stays weakly above the diagonal $y = x$, starts at the origin, and takes steps from the set $\{\uparrow, \rightarrow\} = \{u, r\}$. A pattern is a finite string made from the same step set; it is also a path. We consider $b_{n,k}(m)$, the number of ballot paths containing a given pattern k times reaching (n, m). Certain types of patterns give sequences of polynomials that can be solved using multivariate Finite Operator Calculus. We only consider patterns p such that its reverse pattern $\tilde{p}$ is a ballot path. We require this restriction so that the recurrence relation contains only values of the polynomial sequence that correspond to ballot paths and not the extensions of the polynomial sequence. For example, the pattern $p = uuurr$ would give the recurrence $b_{n,k}(m) = b_{n-1,k}(m) + b_{n,k}(m-1) - b_{n-2,k}(m-3) + b_{n-2,k-1}(m-3)$ when $m > n$ and $b_{n,k}(n) = b_{n-1,k}(n)$, so if we used the first recurrence to define the polynomials, we would be using values below the diagonal that do not correspond to ballot paths. Notice that $\tilde{p} = uurrr$ is not a ballot path. To develop the recursions, we need to investigate the properties of the pattern we wish to avoid. Ballot paths reaching the diagonal can be viewed as Dyck paths. (Received September 11, 2009)