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Nathan T. Moyer* (nmoyer@whitworth.edu), Whitworth University, Math and Computer Science Dept., 300 W. Hawthorne Rd., Spokane, WA 99251. *A Walk Counting Combinatorial Identity for Recurrence Sequences.*

The beautiful and simple Fibonacci identity $f_n = \sum_{k \geq 0} \binom{n-k}{k}$ can be generalized to relate any recurrence relation of the form $a_n = pa_{n-1} + qa_{n-2}$ with arbitrary initial conditions to a sum involving binomial coefficients. This talk will introduce and prove this generalized identity by using a method that views the sequence's generating matrix as an adjacency matrix for a graph. By counting the number of closed walks of fixed length on this graph, one can demonstrate a correspondence that yields the generalized identity for the sequence a_n . (Received August 24, 2018)