1067-15-472   **Sylvester David Eriksson-Bique** and **Mary Katherine Solbrig*** (`solbrigm@reed.edu`), 5015 SE Rural St., Portland, Portland, OR 97206, and **Michael Stefanelli**, **Sarah Warkentin**, **Ralph Abbey** and **Ilse Ipsen**. *A Monte Carlo Algorithm for Computing Dot Products with Application to Information Retrieval.*

Our work is focused on randomized algorithms for dot products of vectors that sample a subset of the vector elements and provide an approximation to the dot product based on these. We develop an importance sampling method for a randomized matrix multiplication algorithm by Drineas, Kannan and Mahoney, and derive probabilities that minimize the expected value (with regard to the distributions of the matrix elements) of the variance. We compare these optimized probabilities with uniform probabilities, and derive conditions under which the actual variance of the optimized probabilities is lower. Numerical experiments with query matching in information retrieval applications illustrate that the optimized probabilities produce more accurate matchings than the uniform probabilities, and that they can also be computed efficiently. (Received September 06, 2010)