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Catherine A Bliss* (catherine.bliss@uvm.edu), Department of Mathematics & Statistics, Vermont Complex Systems Center, 16 Colchester Ave., Burlington, VT 05405, and **Morgan R Frank, Chris M Danforth** and **Peter S Dodds**. *Covariance Matrix Adaptation Evolution Strategy for Link Prediction in Dynamic Social Networks*.

Many real world, complex phenomena have underlying structures of evolving networks where nodes and links are added and removed over time. A central scientific challenge is the description and explanation of network dynamics, with a key test being the prediction of short and long term changes. For the problem of short-term link prediction, existing methods attempt to determine neighborhood metrics that correlate with the appearance of a link in the next observation period. Recent work has suggested that the incorporation of topological features and node attributes can improve link prediction. We provide a novel approach to predicting future links by applying Covariance Matrix Adaptation Evolution Strategy to optimize weights which are used in a linear combination of sixteen neighborhood and node similarity indices. We examine a large dynamic social network with over 10^6 nodes (Twitter Reciprocal Reply Networks), both as a test of our general method and as a problem of scientific interest in itself. Our methods exhibit fast convergence and, to our knowledge, strongly outperforming all extant methods. Based on our findings, we suggest possible factors which may be driving the evolution of Twitter reciprocal reply networks. (Received September 12, 2013)