1048-34-275 **Patrick De Leenheer*** (deleenhe@math.ufl.edu), **David Angeli** and **Eduardo Sontag**.

Graph-theoretic characterizations of monotonicity of chemical networks in reaction coordinates.

This paper derives new results for certain classes of chemical reaction networks, linking structural to dynamical properties. In particular, it investigates their monotonicity and convergence without making assumptions on the form of the kinetics (e.g., mass-action) of the dynamical equations involved, and relying only on stoichiometric constraints. The key idea is to finding an alternative representation under which the resulting system is monotone. As a simple example, the paper shows that a phosphorylation/dephosphorylation process, which is involved in many signaling cascades, has a global stability property. We also provide a global stability result for a more complicated example that describes a regulatory pathway of a prevalent signal transduction module, the MAPK cascade. (Received February 09, 2009)