Balázs Boros* (borosbalazs84@gmail.com). On the existence of positive steady states for deficiency-one mass action systems with two linkage classes. Preliminary report.

The mass action differential equation of chemical reaction networks takes the form $\dot{x}(\tau) = Y \cdot A_\kappa \cdot x(\tau)^Y$, where $Y$ is the matrix of complexes, $\kappa$ is the reaction rate coefficient function, $A_\kappa$ is the Laplacian of the labelled Feinberg-Horn-Jackson graph, and $x^Y$ is a shorthand notation for the function with monomial coordinates with the powers being the entries of $Y$. The existence of positive steady states of such ODE’s is of interest. Clearly, the existence of a positive vector in the kernel of $Y \cdot A_\kappa$ is a prerequisite for the existence of a positive steady state. Based on general theorems, for several mass action systems, the existence of such a positive vector in the kernel of $Y \cdot A_\kappa$ is also sufficient for the existence of a positive steady state. In this talk, we will examine the sufficiency for deficiency-one mass action systems with two linkage classes. (Received August 09, 2015)