

# Chemical Networks of Reversible Binding Reactions

Gilles Gnacadja

Research and Development Information Systems, Amgen, Inc.  
One Amgen Center Drive, Thousand Oaks, California 91320-1799, USA

gnacadja@amgen.com

+1-805-447-8461

<http://math.GillesGnacadja.info>

## Poster Abstract

Systems of reversible binding reactions occur in biopharmaceutical research, e.g. in the study of the receptor-mediated effects of pathogenic and therapeutic ligands. The class of complete networks encompasses a large collection of such systems. For a complete network, the nonnegative stoichiometric compatibility classes are convex polytopes represented by chemically genuine conservation equations. Each contains an equilibrium state that is unique, detailed-balanced and globally attractive. These properties derive in part from the remarkable features of a polynomial system that describes the equilibrium state, e.g. its Jacobian matrix is a P-matrix everywhere. A simple formula gives the deficiency.