Bi-transitive bipartite graphs and genes

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A digraph $\Gamma(V, E)$ is *bi-transitive* if, for any $x, y, z, v \in V$, $xv \in E$ whenever $xy, yz, zv \in E$. 2-colored best mach graphs (2-cBMGs) are a family of bi-transitive bipartite digraphs which are used to model the most closely related genes in a phylogentic tree. Being able to correctly infer which genes are the most related in an evolutionary scenario will have important consequences in assigning functionality to genes. Recently I have proved that if a bi-transitive bipartite digraph contains no equivalent vertices, then its directed cycles have length 2. In this talk, we will see how such result can be efficiently used to enumerate and reconstruct 2-cBMGs.

Keywords: bipartite digraphs, genetics, algorithms