Foster coefficients and the Jacobian of a metric graph

Date Tuesday, February, 19

Time 4 pm

Location 622 Math

Abstract: For a weighted graph G, let $F(e)$ be the proportion of weighted spanning trees that fail to contain the edge e. In 1949, R.M. Foster discovered that the sum of the quantities $F(e)$ over all edges of the graph is equal to the integer $\#(edges) - \#(vertices) + 1$, a well-known topological invariant of the graph. (His original result and proof were formulated in the language of circuit theory.) A construction inspired by the theory of Riemann surfaces and Arakelov intersection theory gives a novel interpretation of the Foster coefficients $F(e)$. I will introduce the Jacobian of a metric graph, relate it to the more widely known Jacobian group of an unweighted graph, and describe how the Foster coefficients arise naturally in this context. This is joint work with Matt Baker.