A new \( Y\Delta \) equivalence class of projective planar maps.

A map \( G \) on a closed surface \( F^2 \) is \( k \)-representative if every noncontractible closed curve on \( F^2 \) hits \( G \) at least \( k \) times. Randby proved that for any \( k \geq 1 \), any two minor-minimal \( k \)-representative maps on the projective plane \( P^2 \) (i.e., w.r.t. minor operations) can be transformed by \( Y\Delta \)-exchanges. So the class of minor-minimal \( k \)-representative maps on \( P^2 \) forms a \( Y\Delta \)-equivalence class.

Recently, finding a relation between a certain quadrangulation on \( P^2 \) and a rhombus tiling of a regular \( 2k \)-gon, we proved that if \( G \) is a minor-minimal \( k \)-representative map on \( P^2 \), then the “medial graph” \( M(G) \) can be regarded as a system of “straight” noncontractible curves on \( P^2 \) (where \( M(G) \) is the 4-regular map with vertex set \( E(G) \) such that two vertices \( e \) and \( e' \) are adjacent in \( M(G) \) if and only if \( e \) and \( e' \) are consecutive on some facial walk in \( G \)). This fact enables us to give a intuitive proof of Randby’s theorem.

In our talk, extending the above observation on geometry, we find a new \( Y\Delta \) equivalence class of projective planar maps, including those classes of minor minimal \( k \)-representative maps on \( P^2 \). (Received September 16, 2018)