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Jihui Huang* (huang.684@osu.edu), 231 W 18th Ave, Columbus, OH 43210. *Classification of soliton graphs for KP equation.*

The Kadomtsev-Peviasvili (KP) equation describes 2-dimensional wave patterns observed in shallow water. The solutions called KP solitons are parametrized by totally non-negative Grassmann variety. The soliton graphs are the patterns generated by the KP solitons. For $\text{Gr}(1,n)$ and $\text{Gr}(2,n)$ cases, the soliton graphs can be constructed from the triangulations of n -gon. However, in general, even for $\text{Gr}(3,n)$ case, the soliton graphs can be very complicated, and they have not been classified. We intend to classify the soliton graphs for general case of $\text{Gr}(k,n)$ using the symmetries of the KP equation, the KP hierarchy. Then the soliton graphs are considered as the dual graphs to subdivisions of zonotopes generated by the multiple times of the symmetry parameters in the KP hierarchy. We show that topological representation of zonotopal tilings leads to a classification of the soliton graphs. In this talk, we illustrate the classification using the soliton graphs for $n=5$ and $n=6$ cases. (Received February 13, 2013)