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Zonotopal combinatorics.

This is a graph-theoretic sequel to our prior algebraic work on the theory of three multivariate polynomial algebras: external, central and external, associated to a given linear endomorphism, its zonotope, and its hyperplane arrangements. When the said endomorphism is induced by a graph, the external algebra provides information about the spanning forests, the central algebra about the spanning trees, and the internal algebra about the spanning trees without internal activity. Correspondingly, three families of parking functions: external, central and internal, are associated to an arbitrary graph. These three classes of parking functions can be also viewed as monomizations of the kernels of the corresponding multivariate polynomial ideals from our earlier work, and the Tutte polynomial of a graph is closely connected to the Hilbert series of its external, central and external algebras. This line of work is motivated by earlier results of Postnikov, B. Shapiro and M. Shapiro on central and external parking functions. (Received March 03, 2009)