A sign pattern (matrix) $\mathcal{A}$ is a matrix whose entries are from the set $\{+, -, 0\}$. The qualitative class of $\mathcal{A}$, denoted $Q(\mathcal{A})$, is defined as $Q(\mathcal{A}) = \{ B \in M_n(\mathbb{R}) \mid \text{sgn}(B) = \mathcal{A} \}$. The refined inertia of a square real matrix $B$, denoted $\text{ri}(B)$, is the ordered 4-tuple $(n_+(B), n_-(B), n_z(B), 2n_p(B))$, where $n_+(B)$ (resp., $n_-(B)$) is the number of eigenvalues of $B$ with positive (resp., negative) real part, $n_z(B)$ is the number of zero eigenvalues of $B$, and $2n_p(B)$ is the number of pure imaginary eigenvalues of $B$. The set of refined inertias $\mathbb{H}_n = \{(0, n, 0, 0), (0, n - 2, 0, 2), (2, n - 2, 0, 0)\}$ is important for the onset of Hopf bifurcation in dynamical systems. An $n \times n$ sign pattern $\mathcal{A}$ is said to require $\mathbb{H}_n$ if $\mathbb{H}_n = \{ \text{ri}(B) \mid B \in Q(\mathcal{A}) \}$.

In this talk, we discuss the star and path sign patterns that require $\mathbb{H}_n$. It is shown that for each $n \geq 5$, a star sign pattern requires $\mathbb{H}_n$ if and only if it is equivalent to one of the five sign patterns identified in the talk. It is also shown that no path sign pattern of order $n \geq 5$ requires $\mathbb{H}_n$. (Received August 08, 2017)