The notion of principal configuration of immersions of surfaces into \( \mathbb{R}^3 \), due to Sotomayor and Gutierrez [16] for lines of curvature and umbilics, is extended to that of mean directional configuration for immersed surfaces in \( \mathbb{R}^4 \). This configuration consists on the families of mean directionally curved lines, along which the second fundamental form points in the direction of the mean curvature vector, and their singularities, called here \( H \)-singularities.

The concepts of \( H \)-singularities and periodic mean directionally curved lines are studied here in detail. Also the notion of principal structural stability of immersions of surfaces into \( \mathbb{R}^3 \) is extended to that of mean directional structural stability, for the case of surfaces in \( \mathbb{R}^4 \). Sufficient conditions for immersions to be mean directionally structurally stable are provided in terms of \( H \)-singularities, periodic mean directionally curved lines and the asymptotic behavior of all the other mean directionally curved lines.

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