Morse-Smale flows in the Boy's surface

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Morse-Smale (MS) dynamical systems are amongst the simplest possible dynamical systems, with strong restrictions imposed on its critical points. In this thesis, I present a brief history of the development of the theory, along with the introduction of important definitions, theorems and lemmas. Moreover, I investigate MS systems in the Boy's surface (P') with emphasis on optimal ones. A method relying only on topological features has been used in order to classify MS systems in P'. A review of some topological properties of this space is presented in order to construct the necessary arguments that allowed the discovery of this type of flow in P'.

At the time this thesis was written, there was no current work in the literature regarding the classification of all optimal MS flows in P'. Hence, my original contribution to knowledge here is the finding of all 342 optimal MS flows in P', the finding of all 80 optimal Projective MS (PMS) flows (Projective MS flows in P'are those MS flows in P'that can be extended to MS flow in $\mathbf{R}P^2$) in P', and the exposure of a few non-optimal ones, as a preparatory path for future researchers, all up to symmetry.