From constant mean curvature surfaces to overdetermined elliptic problems

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Abstract. Analysis tools (PDE's Theory, Functional Analysis, Measure Theory, Harmonic Analysis,...) are often used in Differential Geometry to solve natural problems concerning minimal or constant mean curvature surfaces. Conversely, the use of Geometry as a tool to solve analytical problems is less frequent. In this talk I would like to show that minimal and constant mean curvature surfaces can be used in order to find a classification of solutions to some overdetermined elliptic problems in domains of $\mathbb{R}^n$ (and also in domains of other geometric spaces), i.e. solutions to an elliptic differential equation as $\Delta u = f(u)$ with two boundary conditions. In particular, I will show some results obtained in collaboration with F. Schlenk, A. Ros and F. Morabito.

References

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