



A Non-Profit Association of a Learned Society

International Society of Nonlinear Mathematical Physics

isnmp.de

A Talk at the 2nd ISNMP Conference

Bad Ems, 28 June to 4 July 2026

Regular Session:

Speaker: Yoshiki Jikumaru (Toyo University, Tokyo, Japan)

Title: *On the governing equations of membrane O surfaces*

Abstract: It is known that a shell membrane in equilibrium where a constant purely normal load acts on the membrane, and where the principal curvature lines coincide with the principal stress lines, forms an integrable system called a membrane O surface [1]. In this talk, we formulate the governing equations for membrane O surfaces of the 1st and 2nd kind, which are analogues to Guichard surfaces of the 1st and 2nd kind introduced by Calapso. Furthermore, under this formulation, we show that membrane O surfaces are suitable subclasses of Demoulin's Ω surfaces, and that the Bäcklund transformation for membrane O surfaces preserves membrane O surfaces of the 1st and 2nd kind, respectively.

References

- [1] C. Rogers, W. K. Schief, On the equilibrium of shell membranes under normal loading. Hidden integrability. *Proc. R. Soc. A* **459**, 2449–2462 (2003).
- [2] Y. Jikumaru, On the governing equations of membrane O surfaces, arXiv:2510.19284.