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A Weierstrass type representation of Constrained Willmore surfaces.

In a first part, we present a joint work with Josef Dorfmeister : a Weierstrass type representation for constrained Willmore surfaces in spheres. Using appropriates (moving) frames and a appropriate Lie algebra decomposition of so(1,n+3), we translate the PDE of constrained Willmore surfaces into the Lie algebra setting : namely we rewrite it as a Maurer-Cartan equation of an extended Maurer Cartan form of the frame associated to the surface. Then using some "Bruhat" decomposition of SO(1,3), we consider appropriate versions of the Iwasawa and the Birkhoff decompositions of the loop group. This allows us to construct a DPW algorithm for constrained Willmore surfaces and hence to obtain a Weierstrass type representation for these surfaces in terms of holomorphic (or meromorphic) potentials. In a second part, we characterize the conformal Gauss maps of constrained Willmore surfaces (personal work) : in particular, we generalize a theorem of Dorfmeister and Wang for Willmore surfaces to constrained Willmore surfaces.

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