

# Non-Associative Moufang Loops of Point Classes on Cubic Surfaces

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We describe Moufang loops associated with cubic surfaces. Such Moufang loops appeared in a Yu.I. Manin book about Cubic hypersurfaces, 1st Russian edition published in 1968. All previously known examples of Moufang loops of point classes on cubic hypersurfaces were associative and so Abelian groups as Abelian groups of elliptic curves, hypersurfaces of dimension 1. Moreover, H.P.F. Swinnerton-Dyer established that for non-degenerate and quite general cubic surfaces over local fields Moufang loops for these cubic surfaces are actually associative. In his book Yu.I. Manin stated a natural question over 50 years ago. Do there really exist non-associative Moufang loops of classes of points on cubic hypersurfaces? In my talk I give the first example of this nature for a cubic surface defined over local fields and describe a class of cubic surfaces over number fields for which I conjecture that they have non-associative Moufang loops of point classes. All required concepts will be recalled.