Some properties of affine ruled submanifolds

Olena Shugailo
(V. N. Karazin Kharkiv National University, Kharkiv, Ukraine)
E-mail: `shugailo@karazin.ua`

We consider an affine ruled submanifolds of arbitrary dimension and codimension in the classical sense, that is, a ruled submanifolds over a curve.

Using the equiaffine theory of curves in an arbitrary affine space [1] we choose the most convenient parameterization and transversal distribution of the affine immersion of a ruled submanifold in general case, i. e., of arbitrary dimension and codimension.

All affine characteristics (induced connection, transversal connection, affine fundamental forms, Weingarten operators, curvature tensor) of such an affine immersion are found depending on the characteristics of the base curve and rectilinear generators.

We find the conditions for a base curve and directions of rectilinear generators so that the induced connection is flat. These conditions coincide with the already known properties of affine immersions with flat connection ([2]-[6]). Also we find the conditions for a base curve and directions of rectilinear generators so that the chosen transversal distribution is equiaffine.

Acknowledgment. The author acknowledge the partial support from the Akhiezer Foundation.

References

[1] Davis D. Generic affine differential geometry of curves in R^n. *Proceedings of the Royal Society of Edinburgh Section A: Mathematics*, 136(6) : 1195–1205, 2006

[2] Nomizu K., Pinkall U. On the Geometry of Affine Immersions. *Mathematisce Zeitschrift*, 195 : 165-178, 1987.

[3] Nomizu K., Sasaki T. *Affine differential geometry.* Cambridge University Press, 1994.

[4] Shugailo O.O. On affine immersions with flat connections. *Journal of Math. Physics, Analysis, Geometry*, 8(1) : 90–105, 2012.

[5] Shugailo O. O. Parallel affine immersions $M^n \to \mathbb{R}^{n+2}$ with flat connection. *Ukr. Math. J.*, 65(9) : 1426–1445, 2014.

[6] Shugailo O. O. Equiaffine immersions of codimension two with flat connection and one-dimensional Weingarten mapping. *Matematychni Studii*, 60(1) : 99–-112, 2023.