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Invariant foliations with dynamical systems for the Poisson brackets of hydrodynamic type

An invariant foliation $\mathcal{F}^m$ with an induced non-degenerate metric $\langle v, w\rangle$ of constant curvature K is discovered for any degenerate Poisson bracket of hydrodynamic type on a manifold M^n with $(2,0)$-tensor $g^{ij}(u)$ of rank $m < n$. An invariant dynamical system V on M^n is introduced that is tangent to the leaves of the foliation $\mathcal{F}^m$. The dynamical system V is applied for constructing the scalar and tensor invariants of the Poisson bracket. Invariant $(n-m)$-dimensional nilpotent Lie algebras $\mathcal{A}_u$ are found that are embedded into the cotangent spaces $T^*_u(M^n)$.

References

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