1048-53-280 **Jeanne Clelland***, Dept. of Mathematics, 395 UCB, University of Colorado, Boulder, CO 80309-0395, and **Christopher Moseley** and **George Wilkens**. *Geometry of control-affine systems in low dimensions.*

We introduce the notion of a *point-affine distribution*: a rank s affine distribution on an n-manifold X, together with a distinguished vector field contained in the distribution. This geometric structure is motivated by the consideration of control-affine systems

$$\dot{x} = a_0(x) + A(x)u,$$

where $x \in \mathbb{R}^n$, $u \in \mathbb{R}^s$, $A(x) \in \mathbb{R}^{n \times s}$, and $a_0(x) \in \mathbb{R}^n$. This system gives rise to the affine distribution

$$\mathcal{F}_x = a_0(x) + \mathrm{image}(A(x)),$$

with distinguished vector field $a_0(x)$.

It is well-known that generic distributions on manifolds of dimension ≤ 4 have no local invariants with respect to diffeomorphisms of the underlying manifold. The first local invariants appear for rank 2 distributions on 5-manifolds; these were described in Cartan's famous "five variables" paper. However, invariants appear in lower dimensions for affine distributions; e.g., Elkin found local invariants for rank 1 affine distributions on 3-manifolds. Here we use Cartan's method of equivalence to compute local invariants for point-affine distributions in low dimensions. Local invariants appear even in the smallest non-trivial case: that of rank 1 point-affine distributions on 2-manifolds. (Received February 09, 2009)