1056-14-624   **Alex L Castro*** (`alcastro@ucsc.edu`), 1156 High Street, Mathematics Department, 194 Baskin Engineering, Santa Cruz, CA 95064, and **Richard Montgomery** and **Michail Zhitomirskii**. *Space Curve Singularities and the Semple Tower.* Preliminary report.

Cartan introduced the method of prolongation which can be applied either to manifolds with distributions (Pfaffian systems) or integral curves to these distributions. Repeated application of prolongation to a n-manifold endowed with its tangent bundle yields the Monster tower, or *Semple tower* a sequence of manifolds, each a $\mathbb{R}P^{n-1}$-bundle over the previous one, each endowed with a rank n distribution.

Symmetries of these geometric manifolds, for $n \geq 3$, come from iterated prolongations of local diffeomorphisms of $\mathbb{R}^n$. The philosophy driving the current work is that all questions regarding the Semple tower can be reduced to problems regarding germs spatial curve singularities.

Here we establish a canonical correspondence between points of the Semple tower and finite jets of spatial curves. We show that each point of the Semple tower can be realized by evaluating the k-fold prolongation of an analytic spatial curve germ. Singular points arise from singular curves.

Our main results consist of classifying points in the Semple tower up to symmetry. This has been achieved for orbits of low codimension.

Time permitting we shall also touch upon some open problems. (Received September 14, 2009)