1014-93-952 **Andrew D Lewis*** (andrew@mast.queensu.ca), Department of Mathematics & Statistics, Queen's University, Kingston, ON Canada. *Control theory without controls.* Preliminary report.

In control theory one often considers systems of the form

$$\dot{x}(t) = f_0(x(t)) + \sum_{a=1}^{m} u^a(t) f_a(x(t)),$$

where $f_0, f_1, \ldots, f_m$ are vector fields on a manifold M, $t \mapsto u(t) \in \mathbb{R}^m$ is the control, and $t \mapsto x(t) \in M$ is the trajectory. While in applications the appearance of the controls is natural to the problem formulation, for a study of the *geometry* of the problem, the controls can be thought of as playing the role of a specific set of coordinates: a possibly convenient, but also possibly obfuscating, device.

Thus we propose a formulation of control systems of the form above, but without making a specific choice of controls. Time will prohibit presentation of detailed results, so the talk will focus on the formulation of problems in this abstract setting for control theory. Particularly, we formulate stabilisation and controllability problems, and give a few simple results and examples to suggest that the formulation is a promising one. (Received September 26, 2005)