

## SUMMARY OF THE CONTROL RESEARCH PRESENTED AT THE INSTITUTE : A CARTOON REPRESENTATION

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The following figure presents a somewhat light-hearted summary of some of the control research presented at the workshop. The figure is based on Sisyphus, from Greek Mythology, who rolls a boulder up a hill, only to have the boulder roll down the other side. Of course, this process can occur *ad infinitum*.

The emphasis in this workshop was on model predictive control. In the foreground of the figure we see the boulder of LQG techniques that were developed in the 1960's, to climb the hill of optimal state feedback control problems. Although there were many important theoretical results, these techniques were virtually unused by the chemical process industries. The chemical process industries developed and implemented the boulder of model predictive control techniques in the 1970's and 1980's to climb the hill of multivariable, constrained systems. These techniques sparked the interest of academics working on process control. We see on the final hill, that N-1 academics have begun to work on research relating LQG and MPC approaches, via infinite horizon or state constraint approaches. Notice that there is a lone academic rolling a boulder up the other side of the hill-- Cole Brosilow working on "Internal Model Predictive Control".

We also notice that the fuzzy logic control people are pushing a boulder up a hill. They don't really know the size of the boulder, or exactly where the boulder is located, but (hopefully) they are making progress just the same.

We also see that the Neural Net people have many boulders on many hills. The boulders are all over the place, but they feel that they are getting useful information for control.

At the top of the figure we notice the robustness folks. They are simply trying to keep their boulders between two hills.

To the right of the figure we notice a Zeus-like figure at the top of a tall mountain, standing on a (presumably) stable boulder. This is Charlie Cutler claiming that he doesn't need any of the techniques that the academics are working on.