V-models for nonconvex minimization: A prerequisite for a VU-algorithm

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This talk gives a foundation for designing a future VU-type minimization algorithm to run on semismooth locally Lipschitz functions for which only one Clarke generalized gradient is computed at a point. This entails development of a bundle method sub-algorithm that has provable convergence to stationary points and can make adequate estimates of "V-subspace" bases in the presence of nonconvexity. Ordinary bundle methods generate consecutive "null steps" from a "bundle center" until a "serious step" point is found, which then becomes the next center. A complete VU-algorithm is similar except that its serious descent point is "very serious" which means it defines a good "V-step" and an associated "U-gradient" for making an additional "U-step" to the next center. For an objective function of one variable the desired VU-algorithm exists, but its U-part does not extend to functions of n variables. However, its V-part does extend meaning that for the nonconvex case, two ideas from the single variable algorithm can be adapted to create the desired n-variable bundle subroutine based upon nonconvex "V-models".