1056-14-57 **Veniamin Kisunko*** (vkisunko@math.toronto.edu). *The Converse of Abel's theorem ('polynomial' and 'rational').* Preliminary report.

I investigate an algebraization problem. The analogous problems were raised by Lie and Darboux for classification of surfaces of double translation; by Poincare and Mumford in connection with the Schottky problem; by Griffiths and Henkin in connection with a converse of Abel's theorem; by Bol and Akivis for the algebraization problem in the theory of webs. Interestingly, the complex-analytic technique developed by Griftiths and Henkin for the holomorphic case failed to work in the real smooth setting. I develop a technique of, what I call, complex moments.Together with a differentiation rule it provides a unified approach to all the algebraization problems considered so far. As a result I prove two variants ('polynomial' and 'rational') of a converse of Abel's theorem which significantly generalize results of Griffiths and Henkin. Already the 'polynomial' case is nontrivial leading to a new relation between the algebraization problem in the theory of webs and the converse of Abel's theorem. But, perhaps, the most interesting is the rational case as a new phenomenon occurs: there are forms with logarithmic singularities on special algebraic varieties that satisfy the converse of Abel's theorem. I give a complete description of such varieties and forms. (Received July 23, 2009)