1056-42-1360 **Q. Yen Do*** (qdo@math.ucla.edu), UCLA Department of Mathematics, 520 Portola Plaza, Math Sciences Building 6363, Los Angeles, CA 90095. *A nonlinear stationary phase method for oscillatory Riemann-Hilbert problems.* Preliminary report.

We extend a nonlinear stationary phase method initiated by Varzugin to study asymptotical behaviors of oscillatory Riemann-Hilbert problems arising in the theory of integrable systems, where the oscillating phase is not assumed to be analytic and has a finite number of stationary phase points of arbitrary orders. The main idea is to localize the given Riemann-Hilbert problem to small neighborhoods of stationary points, where the phase function could then be well-approximated by suitable analytic functions and thus allows for a steepest descent argument. (Received September 21, 2009)