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In this talk we derive explicit solutions of integrable nonlinear evolution equations (such as the KdV, mKdV, NLS, and sine-Gordon equations plus their matrix generalizations) by the inverse scattering transform method, where the inverse scattering problem is solved by the Marchenko method. Using a matrix triplet (A, B, C) , the Marchenko integral kernel is written as $Ce^{-(x+y)A}e^{t\phi(A)}B$, with the analytic function $\phi(z)$ depending on the evolution equation. We also discuss transformations of the matrix triplets that leave the solutions invariant. (Received September 20, 2010)