Sato's soliton theory is abelian

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Abstract. Since the success of Morales-Ramis theory that Liouville-Arnold integrability is detected Galois theoretically, we encountered many non-integrable systems. It is marvelous that the principle is so effective. On the other hand, Soliton theory is one of the most remarkable theories developed in the last century. It started in the 19th century by observation of phenomena, mathematical modeling, inverse scattering method, experiments combined with computer science and finally Sato formulated mathematically the whole theory. We observe Sato's theory by our general Galois theory to conclude that Galois group of KP hierarchy is abelian. This shows that KP hierarchy is very much integrable as expected. The result is a simple Galois theoretic interpretation of Sato's great theory.