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Negative order integbale hierarchy and soliton equations

In this talk, I will show how to generate a negative order integrable hierarchy from the Lenard recursion operators, and then find the Lax pair for the entire hierarchy to guarantee the integrability. Interesting thing is that the peakon equation is coming from the negative hierarchy. I will show some amazing examples including the CH, Negative KdV, two-component short pulse equations etc. Particularly, real and complex short pulse equations can be derived from some earlier work I did in 90's.