A new multi-component KP equation

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Summary

Multi-component generalizations of KP hierarchy attract a lot of interest from both physical and mathematical points of view. We propose a new multi-component KP (mcKP) hierarchy which includes two kinds of KP equation with self-consistent sources. This hierarchy also admits reductions to the well-known k-constrained KP hierarchy, which contains second type of soliton equation with self-consistent sources, and n-reduced KP hierarchy with self-consistent sources i.e. Gelfand-Dickey hierarchy with self-consistent sources. So the new mcKP hierarchy provides more general approach to find the soliton equations with self-consistent soiurces and their Lax representations.