Fourth order analogies to the Painlevé equations

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Abstract
In recent years there has been a renewal in the theory of the Painlevé equations. This is because six Painlevé equations were first discovered from strictly mathematical investigations but these equations have recently appeared in several physical applications. Now there is problem to look for other equations that define new transcendental functions with respect to constants of integration.

The aim of this talk is present new forth order ordinary differential equations that have general solutions in the form of transcendents. These equations are found using the general compatibility condition for the usual Painlevé equations. We are going to present eight equations and system of equations but two of them were found before. The isomonodromic linear problem corresponding to these equations are given. These linear problems can be used to solve the equations found by the inverse monodromy transform. Special solutions of equations found are discussed. The Painlevé test to analyze these equations and system is applied. The local representations of the general solutions for equations and systems studied are given.