On the New Face of Kovacic's Algorithm

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Recent progress on Kovacic's algorithm has radically changed the way in which equations of the form $y'' + p(x)\, y' + q(x)\, y = 0$ are solved symbolically. In this talk we describe the rational algorithm of Ulmer and Weil for completely reducible second order equations, then discuss its efficient stand-alone implementation in the bernina system, and finally outline new rational heuristics for the non-completely reducible case.