Parallel Methods for the Monotonicity Verification

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In many computational methods calculations are much easier and faster if we can verify monotonicity of given function $u = u(p)$. This is especially important if the function is a solution of some system of differential equations $F(u, u', u'', ..., p) = 0$. It is possible to control monotonicity of the function by looking at the sign of the derivative $\frac{\partial u(p)}{\partial p_i}$. It is possible to extended that concept to higher order derivatives. Calculation of higher order derivatives is a very computationally intensive task. It is possible to significantly speed up that process by using parallel computing. In this presentation several examples will be presented.