1020-49-109 **John Gregory*** (jgregory@math.siu.edu), Department of Mathematics, Mailcode 4408, Southern Illinois University Carbondale, 1245 Lincoln Drive, Carbondale, IL 62901. *A Systematic Approach to Solving Holonomic Constraint Problems.* Preliminary report.

We give new, systematic methods to solve a variety of constraint optimization problems. That is,

$$\begin{aligned} &\min \textstyle\int_a^b f(t, x(t), x'(t))\, dt \\ &\text{s.t.} \quad h(t, x(t)) = 0, \end{aligned}$$

where $x(t)$ satisfies fixed or free boundary value problems.

In addition, we replace the condition $h(t, x(t)) = 0$ with inequality constraints $h(t, x(t)) \leq 0$ and averaging constraints $\int_a^b h(t, x(t))\, dt = C$, where C is a given constant. (Received August 21, 2006)