

ON A VARIATIONAL APPROXIMATION OF DAEs

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This paper deals to the study and approximation of systems of differential-algebraic equations based on an analysis of a certain error functional. In seeking to minimize the error by using standard descent schemes, the procedure can never get stuck in local minima, but will always and steadily decrease the error until getting to the solution sought. Starting with an initial approximation to the solution, we improve it, adding the solution of some associated linear problems, in such a way that the error is significantly decreased. A variable step procedure is proposed in order to improve the implementation. Some numerical examples are presented to illustrate the main theoretical conclusions. Finally, we should mention that we have already explored in some previous papers this point of view [1], [2], [3]. However, the main hypothesis in these papers asks for some requirements that essentially rule out the application to singular problems.

References

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