

Design and Control of Micro Electro Mechanical Systems for Microfluidic Applications

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Abstract: We show how to reformulate some well-known minimization algorithms in term of dynamic systems. If the infimum of the functional is known, global minimization can be presented as the solution of a boundary value problem. The over-determination is removed using a shooting method for a new functional. But, this functional being discontinuous at maxima of the original functional, this shooting does not necessarily converge. To remove this difficulty a recursive shooting method is introduced removing successively these discontinuities.

The complexity of the approach is shown to remain somehow independent of the size of the minimization problem. The recursive nature of the algorithm makes its implementation easy.

In the second part of the talk the application of the algorithm is shown for various academic and industrial applications. In particular, we show two domains of interest: microfluidic devices design and design in aeronautics applications. For each application, the state equations involved are shortly presented.

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