1106-65-355 **A M. S. Sayfy*** (sayfy@aus.edu), American University of Sharjah, Department of Mathematics and Statistics, P.O. Box 26666, Sharjah, and **S A Khoury** (skhoury@aus.edu), American University of Sharjah, Department of Mathematics and Statistics, P.O. Box 26666, Sharjah.
Patching strategy for second-order two-point singularly perturbed boundary value problems.

The aim of this talk is to introduce different patching approaches to solve second-order two-point boundary value problems that possess singularities or layers. For a singularly perturbed problem, the accuracy of some existing methods, deteriorates away from the singularity or the layer . In contrast, some collocation methods are efficient in the absence of singularities or layers.

Our patching approach is based on decomposing the domain into two sub-intervals: a suitable method is implemented in the vicinity of the boundary layer while in the outer region the problem is tackled by an adaptive cubic spline collocation scheme, which includes the use of redistribution functions or constructed grading functions in case the location of the layer is unknown. Numerical results, computational comparisons, appropriate error measures and illustrations are provided to testify the convergence, efficiency and applicability of the approach.

The adaptive patching strategy could be extended to solve time-dependent problems with moving boundary layers and this is worth further investigation. The scope of our current and future work will focus also on embedding Green's function into fixed point iteration schemes to handle these types of problems. (Received August 25, 2014)