AMRITA
VISHWA VIDYAPEETHAM

21MAT212 - MIS-IV

FINAL TERM PROJECT

I. Project Topic:

ALADIN – α – An open-source MATLAB toolbox

II. Group Members:

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III. Abstract

The project we have taken for this semester is a simple literature review of ALADIN – α: an open-source toolbox in MATLAB used for solving real life problem based on distributed non-convex optimization. Our project work is not limited to a literature review, it will follow up on the implementation of tailored variants of the Augmented Lagrangian Alternating Direction Inexact Newton (ALADIN) algorithm.
Since, the course outcome (CO) of this semester is to get an understanding and develop an insight into the applicability of linear algebra in business and scientific domains.

We will start with a brief introduction of the toolbox and the concepts that acts as pre requisites to understand this toolbox, slowly moving our way up to problem formulation and how it provides with a convergence, followed by code structure and description on further features of the toolbox concluding with the implementation of toolbox on real life applications in the field of chemical engineering, robotics and power systems.
We will implement ALADIN– α on two examples, first one is a minimalistic example showing how to formulate problems in form of objective functions and constraints. The second example focuses on an optimal control problem for a three-vessel chemical process where we would highlight the applicability of ALADIN– α to real-life problems.

Finally, concluding our project with brief comparison of ALADIN result to ALADIN- α's ADMM implementation. Our Project will contain an appendix portion as the concluding portion which describe additional details on the implementation of ALADIN – α.

We are going for the above project topic so as to get a better understanding about the importance of optimization problems in advanced linear algebra and various toolboxes available in MATLAB. As for last semester, we implemented convex optimization problems using CHEBFUN (an open- source software plugin used for numerical computation with functions of a real variable.) So for this semester, we are focusing on non-convex optimization.

IV. Index Terms

MATLAB, Distributed optimization, Non-Convex Optimization, convergence, ALADIN, ADMM, CHEBFUN.

Submitted To: Mr. Jithin Velayudhan