

PROJETO COMPUTACIONAL #5 – MS993/MT404 – 2S2016 – IMECC/UNICAMP

Matemática Aplicada (Não haverá atividades extra para o projeto #5)

Atenção: Este projeto #5 poderá ser desenvolvido individualmente ou com no máximo 3 (três) estudantes.

Atividade	Temas(*)	Disponibilização	Entrega
Projeto #5 (P5) Youcef Saad and Martin H Schultz, GMRES: a generalized minimal residual algorithm for solving nonsymmetric linear systems, SIAM Journal on Scientific and Statistical Computing, 7(3) (1986) 856 - 869. (*) It is advisable to consult all files available into the folder auxFilesP5.	Minimum Residual Method, Symmetric Indefinite Systems of Linear Equations, Large and Sparse Symmetric Indefinite Systems, Conjugate Gradients, Lanczos method, Iterative Solvers, Krylov methods, Matlab native codes; Preconditioning, Matrices and its applications at by using University of Florida Sparse Matrix Collection and Matrix Market.	4/Nov	18/Nov

The primary learning goal of the project. We are primarily focused in the numerical solution of very larger, sparse, nonsymmetric linear system of equations by using the Matlab native implementation of the GMRES method (a member of the Krylov subspace projection methods) first introduced in the paper:

- Youcef Saad and Martin H Schultz, GMRES: a generalized minimal residual algorithm for solving nonsymmetric linear systems, SIAM Journal on Scientific and Statistical Computing, 7(3) (1986) 856 - 869.

Obs.: Clearly, we point out that the main goal in this assignment is closely related to the previous assignments, namely, Projetos #1, #2, #3 and #4.

TASK. In this topic, as before, you should go to The University of Florida Sparse Matrix Collection (link : <http://www.cise.ufl.edu/research/sparse/matrices/>) and then select 5 (five) nonsymmetric matrices (**in which the right hand side \mathbf{b} is available**) take into account distinct physical/science/engineering application problems. Next, you must perform a comparative study, including advantages and disadvantages (theoretical, numerical and application view points) in the same good lines (mandatory) as the previous assignments and also following “dicas” at <http://www.ime.unicamp.br/~ms993/sites/default/files/DicasElaboracaoProjetos.pdf>

Remark. This assignment it is even more intricate and challenging than the previous projects. Indeed, it is expected you will establish possible connections with all previous projects aiming a more deeper improvement in the theory, numerics and applications linked to the scope of this course.