

LES 6ÈMES JOURNÉES MONTRÉALAISES DE CALCUL SCIENTIFIQUE
4–6 MAI 2009

THE 6TH MONTREAL SCIENTIFIC COMPUTING DAYS
MAY 4–6, 2009

Preconditioning strategies and conjugate gradient method for saddle-point
system arising from linearized elasticity equations

A. EL MALIKI, M. FORTIN, A. FORTIN

GIREF Université Laval
1045 avenue de la Médecine, local VCH-1448
Pavillon Alexandre-Vachon
Québec, QC G1V 0A6
CANADA
abderrahman.el-maliki.1@ulaval.ca
mfortin@mat.ulaval.ca
afortin@giref.ulaval.ca

We propose efficient preconditioning techniques for the solution of large and realistic 3D problems arising from linearized elasticity equations. The method is developed to solve the saddle-point system arising from mixed formulation, displacement-pressure or displacement-Lagrange multipliers in contact problems. The construction of a robust preconditioner for displacement and a good approximation of the Schur complement are two essential ingredients for the success of a two-by-two block symmetric indefinite preconditioner. This combination guarantees the good performance of the Preconditioned Conjugate Gradient (PCG). Finally, we present some numerical results to illustrate the potential and efficiency of the proposed strategies.