diplom

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Algorithm 1 BCG

Require: $A \in R^{n \times n}, B \in R^{n \times m}$

$R_0 = B - AX_0$

$P_1 = R_0 S_0$ ▷ $S_0 \in R^{r \times m}$ - select matrix

while $iter < maxiter$ **do**

  $\alpha_k = (P_k^* A P_k)^{-1} P_k^* R_{k-1}$

  $X_k = X_{k-1} + P_k \alpha_k$

  $R_k = R_{k-1} - A P_k \alpha_k$

  $R_k S_{k-1} = Q_k T_k M_k$ ▷ PQR decomposition

  $ind \leftarrow i : |diag(T_k)_i| < eps$

  if $\nexists i : |diag(T_k)_i| < eps$ **then**

    $\beta_k = (P_k^* A P_k)^{-1} P_k^* A R_{k-1} S_k$

    $P_{k+1} = R_k S_k - P_k \beta_k$

    if is_empty(V) == false **then**

      $\gamma_k = V_k^* A R_k S_k$

      $P_{k+1} = P_{k+1} - V_k \gamma_k$

    end if

  else

    $\hat{M}$ is first ind columns of M

    with $\hat{S}_k$ select new columns from R_k

    $S_k = [S_{k-1} \hat{M}_k^T \ \hat{S}_k]$

    $P_k M_k^T = [\hat{P}_k \ \tilde{P}_k] \tilde{R}_k$ ▷ QR decomposition with A-scalar product

    $V_k = [V_{k-1} \ \tilde{P}_k]$

    $\beta_k = \hat{P}_k^* A R_k S_k$

    $\gamma = V_k^* A R_k S_k$

    $P_{k+1} = R_k S_k - \hat{P}_k \beta_k - V_k \gamma_k$

  end if

end while