
Compute $r^{(0)} = b - Ax^{(0)}$

for $i = 1, 2, \dots$
 solve $Mz^{(i-1)} = r^{(i-1)}$

$$\rho_{i-1} = r^{(i-1)T} z^{(i-1)}$$

if $i = 1$
 $p^{(1)} = z^{(0)}$

else

$$\beta_{i-1} = \rho_{i-1}/\rho_{i-2}$$

$$p^{(i)} = z^{(i-1)} + \beta_{i-1} p^{(i-1)}$$

endif

$$q^{(i)} = Ap^{(i)}$$

$$\alpha_i = \rho_{i-1}/p^{(i)T} q^{(i)}$$

$$x^{(i)} = x^{(i-1)} + \alpha_i p^{(i)}$$

$$r^{(i)} = r^{(i-1)} - \alpha_i q^{(i)}$$

Check convergence: $\|r^{(i)}\|_2 \leq \epsilon \|b\|_2$

end

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call psb_geaxpby(one,b,zero,r,desc_a,info)
rho = zero
iterate: do it = 1, itmax
    call psb_spsm(one,L,r,zero,w,desc_a,info)
    call psb_spsm(one,U,w,zero,z,desc_a,info)
    rho_old = rho; rho = psb_gedot(r,z,desc_a,info)
    if (it == 1) then
        call psb_geaxpby(one,z,zero,p,desc_a,info)
    else
        beta = rho/rho_old
        call psb_geaxpby(one,z,beta,p,desc_a,info)
    endif
    call psb_spmm(one,A,p,zero,q,desc_a,info)
    sigma = psb_gedot(p,q,desc_a,info); alpha = rho/sigma
    call psb_geaxpby(alpha,p,one,x,desc_a,info)
    call psb_geaxpby(-alpha,q,one,r,desc_a,info)
    rn2 = psb_genrm2(r,desc_a,info)
    bn2 = psb_genrm2(b,desc_a,info)
    err = rn2/bn2
    if (err.lt.eps) exit iterate
enddo iterate
```