

Multilevel QD Iteration Algorithm

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while  $t^n < t^{end}$  do
  while  $\|\Delta T^{(k)}\| > \epsilon_T \|T^{(k)}\| + \epsilon_T^*$ ,  $\|\Delta E^{(k)}\| > \epsilon_E \|E^{(k)}\| + \epsilon_E^*$  do
    • Transport iterations: given  $T^{(k)}$ ;
     $k = 0$ :  $T^{(0)} = T^{n-1}$ ,  $f_{g,\beta\gamma}^{(1/2)} = f_{g,\beta\gamma}^{n-1}$ ;
    if  $k > 0$  then
      Solve multigroup HORT eqs. for  $I_g^{(k+1/2)}$ ;
      Compute group QD factors  $f_{g,\beta\gamma}^{(k+1/2)}$ ;
    end
    while  $\|\Delta T^{(m,k)}\| > \tilde{\epsilon}_T \|T^{(m,k)}\| + \tilde{\epsilon}_T^*$ ,  $\|\Delta E^{(m,k)}\| > \tilde{\epsilon}_E \|E^{(m,k)}\| + \tilde{\epsilon}_E^*$ 
      do
        • Iterations for solving MLOQD eqs.: Given  $T^{(m,k)}$  and  $f_{g,\beta\gamma}^{(k+1/2)}$ ;
        Solve MLOQD eqs. for  $E_g^{(m+1,k)}$  and  $F_g^{(m+1,k)}$ ;
        Compute grey opacities  $\tilde{\kappa}_E^{(m+1,k)}$ ,  $\tilde{\kappa}_R^{(m+1,k)}$  and factors  $\tilde{f}_{\beta\gamma}^{(m+1,k+1/2)}$ ;
        • Iterations in grey problem: Solve GLOQD eqs. coupled with EB
          eq. for  $E^{(m+1,k)}$ ,  $F^{(m+1,k)}$ , and  $T^{(m+1,k)}$ 
      end
       $T^{(m+1)} \leftarrow T^{(m+1,k)}$ ;
    end
     $T^n \leftarrow T^{(k+1)}$ ;
  end
end
  
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