

PARALLEL CODE: SPECTRAL SPACE DERIVATIVES

The big advantage of spectral codes is that derivatives are reduced to mere multiplications.

We need to understand the ordering of the k 's so that we can create the multiplication matrices once and for all.

```

ccx = two_pi/x_max

Do ij = my_k%min,my_k%max
#ifdef T3E
  i = 1 + (ij-1)/(ny_dealias)
#endif
#ifdef SP2
  i = 1 + Mod(ij-1,nx_dealias/2)
#endif
  ikx(ij) = ccx*(i-1)
End Do

If (three_dimensional) Then
  Allocate(iky(my_k%min:my_k%max))
  ccy = two_pi/y_max
  Do ij = my_k%min, my_k%max
#ifdef T3E
    j = 1 + Mod(ij-1, ny_dealias)
    i = 1 + (ij-1)/(ny_dealias)
#endif
#ifdef SP2
    i = 1 + Mod(ij-1, nx_dealias/2)
    j = 1 + (ij-1)/(nx_dealias/2)
#endif
    If (j <= (ny_dealias+1)/2) Then
      iky(ij) = ccy*(j-1)
    Else
      iky(ij) = -ccy*(ny_dealias+1-j)
    End If

    ksqr(ij) = -ikx(ij)**2 - iky(ij)**2
  Enddo
Else ! Two dimensional
  Do ij = my_k%min,my_k%max
    i = ij
    ksqr(ij) = -ikx(i)**2
  Enddo
End If
sqrt_ksqr = Sqrt(-ksqr)

Allocate(kinv(my_k%min:my_k%max))
If (my_k%min == 1) Then
  kinv(2:) = One/ksqr(2:)
  kinv(1) = Zero
Else
  kinv = One/ksqr
End If

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