Structure of the jacobian matrix

File fmat.x : float numbers of 4 bytes which corresponds to non-zero elements of the Jacobian matrix mat, representing in a sparse format the full jacobian matrix A.

We use two ways of writing into this file and, therefore, we could decide how to do it.

You can read one float by one float which is the way when we built it or you can read it once when you need the entire matrix when already buit.

File fmat.ic : integers of 4 bytes containing the column numbers involved in the matrix element. You read a value ic at the running integer j. In other words, the element mat(j) is in the column ic(j).

File fmat.id : integers of 4 bytes. A value of the running index i gives the matrix row for non-zero elements. The non-zero elements of the row I of the matrix mat are

[mat(id(i)),mat(id(i)+1),...,mat(id(i)+k),...,mat(id(i+1)-1)]

We can read/write these two files following the two ways : read each value at a given time or read all values at once. With these three informations, we can find the relation between mat(*) and A(*,*).

The element mat(id(i)+k) will be at the row i of the matrix A and at the column ic(id(i)+k)

In other words, A(i,ic(id(i)+k))=mat(id(i)+k)

We never form the matrix A and we perform the product « Ax » based on the matrix mat as well as the product « $A^t b$ »