hesian

briefly

[called by: xspech.] [calls: packxi and dforce.]

contents

1.0.1 construction of Hessian matrix

1. The routine dforce is used to compute the derivatives, with respect to interface geometry, of the force imbalance harmonics, $[[p + B^2/2]]_j$, which may be considered to be the "physical" constraints, and if `Igeometry.eq.3` then also the derivatives of the "artificial" spectral constraints, $I_j \equiv (R_\theta X + Z_\theta Y)_j$.

2. The input variable `Lconstraint` determines how the enclosed fluxes, $\Delta\psi_t$ and $\Delta\psi_p$, and the helicity multiplier, μ, vary as the geometry is varied; see global and mp00ac for more details.

1.0.2 construction of eigenvalues and eigenvectors

1. If `LHevalues.eq.T` then the eigenvalues of the Hessian are computed using the NAG routine NAG: F02EBF.

2. If `LHevectors.eq.T` then the eigenvalues and the eigenvectors of the Hessian are computed.

3. Note that if `Igeometry.eq.3`, then the derivative-matrix also contains information regarding how the "artificial" spectral constraints vary with geometry; so, the eigenvalues and eigenvectors are not purely "physical".

4. The eigenvalues and eigenvectors (if required) are written to the file `+.ext.GF.ev` as follows:

```
open(hunit,file="."//trim(ext)//".GF.ev",status="unknown",form="unformatted")
write(hunit)NGdof,Ldvr,Ldvi        ! integers; if only the eigenvalues were computed then Ldvr=Ldvi=1;
write(hunit)evalr(1:NGdof)         ! reals   ; real      part of eigenvalues;
write(hunit)evali(1:NGdof)         ! reals   ; imaginary part of eigenvalues;
write(hunit)evecr(1:NGdof,1:NGdof) ! reals   ; real      part of eigenvalues; only if Ldvr=NGdof;
write(hunit)eveci(1:NGdof,1:NGdof) ! reals   ; imaginary part of eigenvalues; only if Ldvi=NGdof;
close(hunit)
```

5. The eigenvectors are saved in columns of `evecr`, `eveci`, as described by the NAG documentation for NAG: F02EBF.