denergy

Construct "energy" function, and constraints.

[called by: descent.] [calls: bnormal, torflux, tlength, specwid, ccsep.]

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The total energy can be represented as,

$$
\begin{aligned}
E &= \sum_i \omega_i \left(\chi_i - O_i\right)^2 \\
&= \omega_{bnorm} \int_s \frac{1}{2} \frac{(\vec{B}\cdot\vec{n})^2}{|B|^2} ds + \omega_{tflux} \sum_{i=1}^{Nzeta} \frac{1}{2} \frac{(\Psi_i - \Psi_o)^2}{{\Psi_o}^2} + \omega_{length} \frac{\sum_{i=1}^{Ncoils} \exp(L_w L_i)}{N_c \exp(L_w L_o)} \qquad (1) \\
&\quad + \omega_{eqarc} \sum_{i=1}^{Ncoils} \sum_{n=0}^{NFcoil} (\lambda_n^{i\,2}) + \omega_{ccsep} \sum_{i,j=1}^{Ncoils} \int_{c_i} \int_{C_j} \frac{dl_i\ dl_j}{\Delta r^2} \ldots \qquad (2)
\end{aligned}
$$

Right now, the constraints of bnormal, toroidal flux, length, equal-arc angle and coil-coil separation are constructed. Later, more constraints, like coil-plasma separation, coil curvature etc. , will be added.

The subroutines denergy, dBnxyz, dlength were originally written by Dr. S. Hudson, which has a relly fast speed calculating the energy functional and the first derivatives. It's temporarily turned off.

denergy.h last modified on 2016-09-01 11:46:44; Knotopt subroutines;