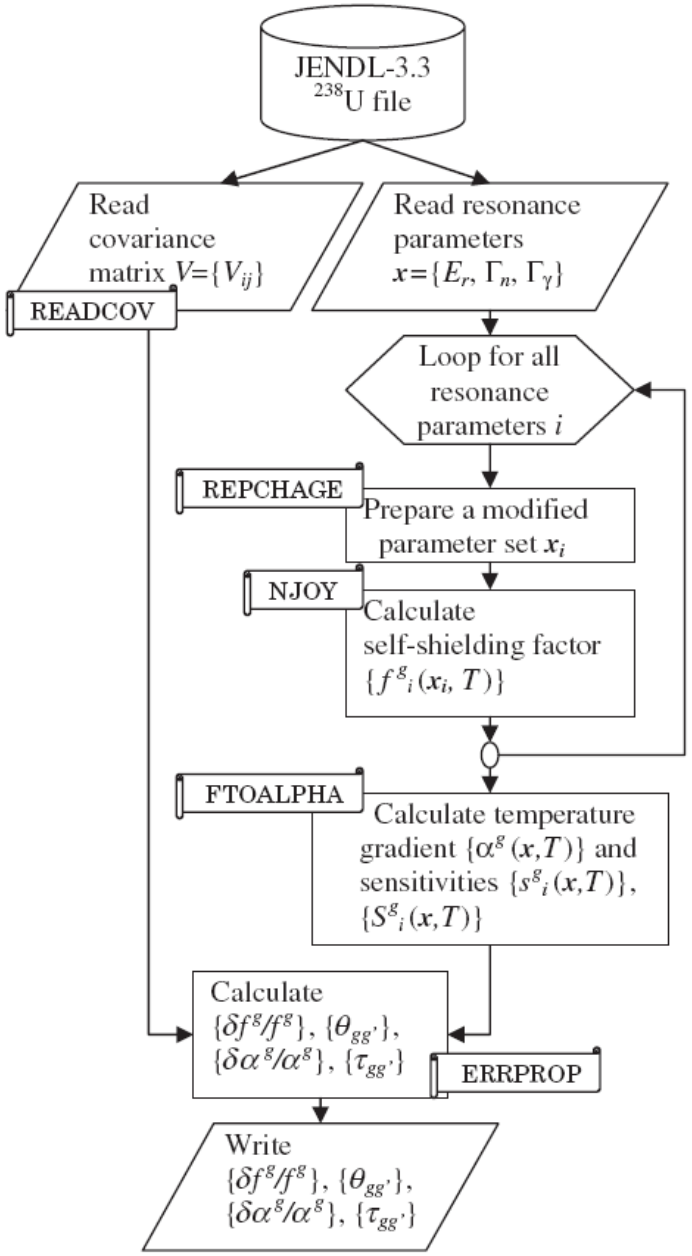
ERRORF

Derivation of **covariances of self-shielding factors** and their temperature gradients from the resonance parameter covariance matrix and the **sensitivity coefficients of the selfshielding factor** and its temperature gradient with respect to resonance parameters in evaluated nuclear data files.

In order to calculate the sensitivity coefficients for nuclides with numerous resonance levels according to the derived equations, a new system **ERRORF** has been developed to obtain covariance matrices of self-shielding factor and its temperature gradient.

This code system— **ERRORF**—consists of NJOY and certain newly developed code modules (READCOV, REPCHANGE, FTOALPHA, and ERRPROP). The flow of calculation in the ERRORF system is summarized in the figure



READCOV: To read nuclear data file in the ENDF-6 format and output resonance parameter covariance matrix.

REPCHANGE: To read nuclear data file in the ENDF-6 format and to change the i-th resonance parameter x_i in $\boldsymbol{x}$ to obtain a modified parameter set x_i, where the i-th parameter is changed from x_i to $(1 + \varepsilon)x_i$. We set ε to 0.05 in the present work.

NJOY: To construct cross section $\sigma(x_i, E, T)$ from the modified resonance parameter set x_i, and to calculate self-shielding factor $f^g(x_i,T)$ from effective cross sections $\sigma^g(x_i,T; \sigma_b)$ and infinite dilution cross sections $\sigma^g(x_i, T_{ref}, \sigma_b = \infty)$

FTOALPHA: To obtain temperature gradient $\alpha^g(x_i,T)$ and sensitivity coefficients $s^g{}_i(x,T)$ and $S^g{}_i(x,T)$ from partial derivatives of $f^g(x_i,T)$ with respect to the resonance parameter and temperature

ERRPROP: To calculate standard deviations $\delta f^g/f^g$ and $\delta\alpha_g/\alpha_g$, and correlation matrices $\theta_{gg'}$ and $\tau_{gg'}$