FILE: dip.dat

This file is used to input geologic dip information into the model objective function. Each region of a given dip angle is specified as a polygon by listing the positions of its vertices in order (either clockwise or counterclockwise). For each region, the dip angle, θ, and a set of coefficients, $(\alpha_s, \alpha_x, \alpha_z)$, for the smallest, x- and z-derivative terms must be specified.

When $\alpha_x \neq \alpha_z$, that is, when coefficients for derivative terms are different, the recovered model will have elongated features in the direction whose coefficient is greater. Therefore, one needs to have $\alpha_x > \alpha_z$ in order to have the desired structure dip with angle θ. If one inputs $\alpha_x < \alpha_z$, the recovered structure will dip at an angle of 90°+θ, that is, it will be perpendicular to the direction defined by θ. (For details, see pp 11–13 of DCIP2D Version 3.0 Manual in JACI Report for 1996.)

DCINV2D and IPINV2D tend to produce models having strong lateral variations near the surface. This structure accounts for the small-scale, rapid, lateral changes in the data. The structure in this near surface region can be extended into deeper portions of the model if the dipping regions start from the surface. To avoid this side effect, steeply dipping regions should begin at a small depth below the surface. Also, the near surface region should have either no preferential dip direction or it should be smoothed horizontally by inputting a zero dip and $\alpha_x > \alpha_z$.

The following is the structure of **dip.dat**:

α_{s0}	α_{x0}	α_{z0}	θ_0	
N				
α_{s1}	α_{x1}	α_{z1}	θ_1	P_1
X_1	Z_1			
:				
X_{P_1}	Z_{P_1}			
:				
:				
α_{sN}	α_{xN}	α_{zN}	θ_N	P_N
X_1	Z_1			
:				
X_{P_N}	Z_{P_N}			

α_{s0} coefficient for the smallest model component for general background.
α_{x0} coefficient for the x-derivative term for general background.
α_{z0} coefficient for the z-derivative term for general background.

θ_0 dip angle (in degrees) for general background.
Any part of the model that is not within the following regions are assigned this set of values for coefficients and dip angle.

N number of regions that have different dip angles and coefficients.
α_{si} coefficient for the smallest model component for region i.
α_{xi} coefficient for the x-derivative term for region i.
α_{zi} coefficient for the z-derivative term for region i.
θ_i dipping angle (in degrees) for region i.
P_i number of points in the polygon defining region i.
X_j, Z_j coordinates for the polygon that defines the ith region ($j = 1, \cdots, P_i$). These points must be input in order, either clockwise or counterclockwise.

Example of dip.dat file: The following file defines a rectangular region that has a dip angle of 45°. The remaining region of the mesh has no preferential dip.

```
0.001 1.0 1.0 0.0          alphas, alphax, alphaz, theta
1                          nrgn
0.001 100 0.1 45.0  4      alphas, alphax, alphaz, theta, npts
-100. 22.
-100. 100.
   0. 100.
   0. 22.
```

NOTE: The coefficient α_s should normally be kept constant in different regions. This is because α_s is now coupled with the smallest weighting function W.S. A variable α_s will result in an equivalent W.S that penalizes deviation from the reference model in the region having a greater value of α_s.