FEMA

(Field Effects Measures and Analyses)

1.28

Documentation current as of December 2011

This manual is divided into sections:

I. INTRODUCTORY
II. DATA
III. DISTANCES
IV. CORRELATION FUNCTIONS
V. WEIGHTS AND TIME
VI. GRAPHICS
VII. REGRESS
VIII. PERMUTATION TESTS
IX. ALPHABETICAL LIST OF COMMANDS

I. INTRODUCTORY [RESULTS, NORESULTS*, DIRECTORY, NODIRECTORY*]

What is FEMA?

FEMA computes measures and test of the organization of vectors from a vaguely field-theoretic way of looking at things. It assumes that you have data that are positional. The data may be "aggregate" in which there is a single observation for a position, or "individual" in which there are multiple observations per position.

After loading the data, FEMA goes to a main command line. (Use DIRECTORY to display the command prompt with the current directory information; NODIRECTORY to turn this off.) Every analysis is done from here, as are changing defaults. There are two main modules, one computing field measures and the other conducting permutation tests.

The analysis creating field measures has two main parts—determining the distance between observations and determining the correlation function. At the command line you can enter all of this at once, or change defaults in pieces. DO tells FEMA to do an analysis; omitting DO changes defaults (how analyses are done) and returns you to the command line. The defaults are GEOmetric distance on the earth and a SINGle vector. Thus DO GEO SINGLE is the same as DO unless you have already changed the defaults. If you first DO an analysis (or DO GEO SINGLE), and then, say, DO MULTIPLE, FEMA will keep the GEO distance but bring in multiple slopes for the computation of the correlation function. There are three kinds of output; the main numerical measures, more detailed information on each correlation, and graphics.

The permutation tests are called with the command PERMUTE; you then select a model and give FEMA a sense of what you want to do to determine your statistics and plot results. Right now only linear regressions and logistic regressions are supported.

If you begin with NESTED data, FEMA will first compute group-level measures using REGRESS which can then be used to construct field analyses via DO.

Ins and Outs

FEMA takes in data (*.dat) written in an ASCII format with one record per line, tab delimited is fine—and writes log files and data files in the same format.

FEMA writes all results (both successful file creation and analyses) to a log file that includes the date and time it was created. For example, FEMA 20-JUL-08—5:14 PM.LOG would be the admittedly long but extremely clear name of a log file. It also writes any warning messages to be used for debugging purposes.

You can also specify that FEMA write results to a text file that can later be read in by another program (this is the RESULTS command; use NORESULTS to turn this off). In order, what this file will contain is the analysis number, the type of analysis, and then the results. The analysis numbers are consecutive and are not reset by changing files; they continue even when NORESULTS is specified. The type of analysis is '1' for the field measures and '2' for the permutation tests. For the field measures, the results are the Total Field Effect, the Field Range, the Standardized Field Effect, and the Average Field Strength (these are in the same order as they appear in the printout). For PERMUTE outputs see that section of the documentation. This

file will look like the LOG file in making reference to the date and time but will be called FEMA-RES have a .DAT extension.

FEMA also SAVEs aggregate results; see the section REGRESS.

When FEMA starts up, it should be in a full-screen mode (no menu bar appears). If so, you may want to make it a window by pressing ALT-<CR>. (Otherwise, it will not appear in the TASKBAR.) The cursor should appear as a blinking square or dash. Sometimes the cursor doesn't blink and is invisible. But it is still there. If everything is invisible, use ALT<CR> to change format.

Most defaults are changed at the command line; for other ones, you use DEFAULTS at the command line and FEMA will allow you to change them before proceeding. The rest of this documentation is organized by topic, with the relevant commands put in brackets after sub-headings, along with relevant non-command defaults in italics.

The rest of this larger section is basically taken from the DAMN manual, and should apply, but you might not really need it because the conventions are much simpler.

About this documentation
In this documentation, the following conventions are used: "<" and ">" brackets enclose a field the precise value of which you must supply. A descriptive label for the field is put between the brackets, for example, <variable number> indicates that you must supply some variable number. You would not write the < > brackets. <CR> means "carriage return" or pressing ENTER.

MAJOR HEADINGS THAT INDICATE CHAPTER START ARE IN CAPS;
Chapter sections are in bold
Sub-sections are in italics
And within this may be numbered lists.

Where you see this symbol, you know that you are being warned about a potential act that can cause FEMA to crash; be extremely attentive.

! Where you see this symbol, there is an important warning that you should pay attention to, in order to avoid a problem, but the problem is usually non-fatal.

Note indicates a less crucial, but important, piece of information brought to your attention.

➢ Where you see this symbol, there is a little tip that can save you some time or help you out in a jam.

Input Conventions
In general, when there is input required of you, you'll see one of two prompts.
? Means a specific answer is required (like yes or no), though <CR> may lead to a default.

> Means you're at a menu where you have more options, or you are entering something like variable names. In such cases, always separate multiple values with a space (or a comma, but avoid both a comma and a space).

- When you are at the main menu, you can simultaneously specify as many commands as you want, and FEMA will probably figure out what you mean. Thus if you sit down and say DO DIST GEO CORR SINGLE LINEN LOG, FEMA will understand that you
  1) Want to set the type of distance to "GEO";
  2) Want to construct distances;
  3) Want these distances to be in a logarithmic metric;
  4) Want to set the type of correlation function to SINGLE;
  5) Want to construct correlations;
  6) Want the resulting plot to use a one-pass smoothing.

  However, it is often simpler for you to do things in steps—that is, first set defaults for DIST and CORR, get these done, adjust output settings, then use your DO command….

If you specify DEBUG on a command line, then FEMA will turn on the DEBUG default for the commands in question, which means it spits a tremendous amount of ugly information to the log file. This is really only useful for fixing the program. To turn it off, specify NODEBUG for the same commands.

In general, when you are entering variables or groups on a single line, use blank spaces to separate group numbers or variable names. Commas with or without spaces can also be used. However, when entering groups, you may use a dash to indicate a range, as long as it goes from low to high. There can be no spaces before or after the hyphen. Thus

> 1 2 3 4 5 6 12 14

is the same as

> 1-6 12 14

Note that if your range includes numbers for which you lack data, FEMA simply ignores them without comment.

When you enter variable names in a list, FEMA saves the last series you entered. If you want to rerun the same variables, simply press <CR> after FEMA shows you the variable names. If you want to add other variables to the ones in memory, type them in directly following a '+' (which needs to be the **first** character you type. If instead you want to **remove** variables to the ones in memory, type in the ones to be removed directly following a '-' (which needs to be the first character). NOTE THAT YOU CANNOT COMBINE + and – syntaxes.

Note that when you enter variables in on a single line, the order that you give does not correspond to the order in which coefficients are displayed. Instead, FEMA always uses the order of variables in the data file.

Finally, if you're ever somewhere you don't want to be, try typing EXIT (all caps), or—if explicitly instructed, X (caps)—and see if this bonks you out to a different level. If you are prompted for a variable name(s) and need to see a list of variables, type $LIST (all caps). Except for EXIT, $LIST and $NONE (see below), FEMA is case-insensitive.

! On some platforms, you may not be able to input more than around one line's worth of characters (I'm not sure why and am working to fix this), which would limit the number of variables. You'll know this because you'll get a beep and FEMA will refuse to accept more. All you need to do is make sure there's no broken word (i.e. the beginning of a variable name you didn't have space to complete…just backspace to the beginning of this name), and make your last character a backslash \, like this.

```
>TIME FRIEND KIN DISTANCE INTER1 INTER2 SAMESTAT SAMETOWN\
```

Then FEMA will let you give more variables on another line.

```
>AGEDIF EDDIF
```

Memory Usage [MEMORY, FREE]
FEMA is made to use a simple and fast flat memory storage approach, rather than writing things to the disk. For this reason, different implementations have different maxima in terms of the number of total individuals that can be handled, the number of groups, the number of individuals in any one group, and so on. Use the MEMORY commands to check the maxima at any time.

Some of FEMAs computational space is allocated during run-time; if it can't free up enough memory, it will tell you. You can try closing other programs, but if your operating system has just given it a certain amount of memory, you can FREE up some internally in some cases. You do this by naming a command that you have run, but you don't want to retain the results. Right now, the options are PERMUTE (which throws away the information on permuted variances, meaning you can no longer use REPLOT), WEIGHT and RELATE. Thus if you use FREE with any combination of these, FEMA will interpret this as a call for destruction.

II. DATA

Main Data File [FILE]

FEMA assumes that your main data are in the form of a single case per line; variables are separated by tabs. The first variable is always a "group membership" variable. This might be an integer representing the sampling unit from which an observation is taken, a geographical area such as a state, or a formal location in a structure of positions such as a hierarchy. There are three kinds of data file, which will be called "*group*," "*individual*" and "*nested*."

A *group* file includes a single line for every position; the data might be correlations or slopes or other vectors, or attributes of this position or group. An example might be county-level data. Here the group membership variable is equivalent to a unique identifier for each case. For *group* data, you might want to have a "size" variable—this would be used by a weighting routine.

In *nested* data, we have multiple observations for each group; an example might be individuals all coming from the same county or SMSA. In this case, all those coming from the same group have the same group identification number. It is not necessary that each case have any other identifier; if they do this is treated like any other variable. If there are multiple observations per position, it is assumed that the location positions are the same for all persons in a position, and that these are present. Thus if your data are individual data from counties and have a latitude and longitude, FEMA expects every person to have a latitude and longitude measure and these to be the same within any position. Only nested data can be used for PERMUTE tests.

Your group identification numbers have to be the first values in your data; they need to be *integers* and they need to be less than 5 digits. They don't need to be consecutive, but they do need to be non-negative and less than 10,000. Finally, your data should be *sorted* by group so that people in the same group are contiguous. However, if you have a *time* variable, it is important that the data be sorted **first** within *time* and **then** without group. Further, it is important that you not have any time where only the first group has a valid observation followed by a time where that group has a row (that is, there are two consecutive rows of the same group), or FEMA will be confused and think that you have *nested* data.

Note that if you have *nested* data, FEMA will assume that all DO analyses happen at the aggregate level—that is, that individuals do not have vectors of their own that would allow us to also examine the field strength between individuals. Also note that here, FEMA will figure out group sizes on its own—there's no reason to have a *size* variable.

In *individual* data, we have persons who are *not* put in any sort of group (this would be the case if we were using FEMA to create social distances). In this case, please make the first variable (the group membership variable) equal to '1' for all persons. This will let FEMA know what is going on.

Do **not** use blanks or periods for missing values; FEMA expects a real number for every place. Right now, you **must** set all missing values to -99. We will deal with more options for missing values later.

! *Reserved Variable Names*

FEMA looks for certain variable names that are used for many analyses; it is good practice not to use these for other variables, as FEMA will get confused. These are

TIME	--	Any number ordering your observations
LAT	--	Latitude
LON	--	Longitude
X	--	Horizontal Coordinate in a FLAT Cartesian position scheme
Y	--	Vertical Coordinate in a FLAT Cartesian position scheme
POS	--	A scalar indicating position in some one-dimensional scheme.
SIZE	--	The number of observations in grouped data

Relational Data File. [RELATE]

You may also load in a "relational" data file that contains information about the relations of positions (not individuals) to one another. Most importantly, you might have information about the distances between positions; you also might have weight information here. Note that this has not yet been debugged. The first two variables are the id numbers of the groups (positions) in question. All dyads should be present; no reflexive dyads should be there (e.g., showing that the distance between group 34 and 34 is 0).

Maxima

Right now, FEMA expects that you have no more than 1400 total cases, of which no more than 150 are in any single group, with no more than 400 groups. It assumes only 28 variables. All this can be changed if there is reason to.

III. DISTANCES [DIST, DUMP, NODUMP*]

FEMA expects something to create distances with for all uses except PERMUTE where it is optional. In general, if you have missing values for a location for some group, all observations will be dropped from analyses. The exception is that SOCIAL distance will use whatever data is available for any pair of cases—as long as they have non-missing values on at least one variable, this will be used, thereby (for now) assuming that they are similar on missing observations. We will later make this more adaptable. Normally, FEMA doesn't print out the distances for each pair of areas; use DUMP to tell FEMA to print this to the logfile; NODUMP turns this off.

Geographic. [GEO]

FEMA computes these distances on the basis of a latitude and a longitude attached to each observation. That means if you have individual-level data, it still assumes we have latitude and longitude data for each individual. FEMA will ask you to specify a variable containing the longitude and one containing the latitude of each observation. We suggest these be called LON and LAT respectively. If LAT and LON are present in your file, FEMA will automatically use them (so don't have other variables with these names!) If it can't find them, it will ask you to specify variables containing latitude and longitude information. These are to be in *degrees* (not radians). Make sure they are between 0 and 360!

Cartesian [FLAT]

Here FEMA understands the position of each unit as specified in a flat two-dimensional space, as opposed to the polar coordinates of a curved earth. FEMA will ask you to specify a variable containing the horizontal (X) position and the vertical (Y) position of each observation. It is assumed that these are in whatever distance metric you want. We suggest these be called X and Y respectively. If X and Y are present in your file, FEMA will automatically use them (so don't have other variables with these names!) If it can't find them, it will ask you to specify variables containing this information.

Differences. [DIFFER]

Here FEMA expects there to be a file in the main data set that has a position for each observation. The distance between any two positions in simply their absolute value.

External. [OUTSIDE]

This allows you to bring a special set of distances in with a relational file (see DATA/**Relational** above).

Social Distance [SOCIAL, HAMMING, CARTESIAN]

You may also compute the "social distance" between groups; each group is understood as a "position" and the positions' distance is how different the groups are on a set of variables. Make sure that you have read section I above and have your data in the proper format.

To determine the distance, you can either use the conventional Cartesian distance, or the "Hamming Distance." This is the absolute value of the difference between binary vectors; it would be the number of differences in attributes for a set of dichotomous variables. Here it can also be used to compute simply the absolute value difference.

It is in some cases possible to use a different distance metric once the groups are created, but it has to involve something that is homogenous within groups. This is not advised anyway. If you would like to then compute the correlation function based on individual level variables, your best bet might be to use MULTIPLE (even if you only have one variable).

When you want to create new groups using new variables, use DO DIST.

Metric [LOG, NOLOG]
You can specify that FEMA transform the distance to a logarithmic scale with LOG and turn this off with NOLOG. Because of the problem of zero distances, this is actually $\log(x + 1)$, where x is in whatever metric specified (statute miles, if you used GEO).

In all cases, you can use DIST to tell FEMA that you want to re-create a distance. So for example, if you had first used GEO, and then DIFFER, and wanted to use a different positional variable for a DIFFERence function, you would just say DO DIST and FEMA would have you re-create a DIFFERence based distance.

IV. CORRELATION FUNCTIONS [CORR, DUMP, NODUMP*]

Here FEMA produces a correlation function between any two areas or groups. For NESTED data, this requires that there be an aggregated file as the result of REGRESS. Normally, FEMA doesn't print out the correlations for each pair of areas; use DUMP to tell FEMA to print this to the logfile; NODUMP turns this off.

Single Vector [SINGLE, VECTOR, BOUNDED]

In this case, FEMA computes the correlation across positions using a single vector. The default case (VECTOR) turns a slope into vector. This is the most intuitively pleasing use of FEMA, but also the most complicated. Here each unit is considered to have a vector, and the correlation is computed by doing the vector correlation, assuming that each vector is given in a two-dimensional space where the "x" distance is 1 and the "y" distance is whatever is specified. Thus a regression slope has a nice interpretation in just this way. However, normalizations will dramatically affect this quantity. Thus you need to think through the logic of the comparison that you are making.

You can also specify BOUNDED to have the correlation function simply be a transformation of the absolute value of the difference between the two vectors onto the scale -1 to 1. This requires that your vectors already be bounded between 1 and -1.

Any pairs involving any case with a missing value are of course dropped from analysis.

Multiple Vector [MULT, FIXMULT*, NOFIXMULT, Z*, NOZ, MINIME*, NOMINI, PCT, NOPCT]

Here you enter multiple vectors, and FEMA considers the correlation between two units to be a function of the distance between the two points in a multidimensional space. That is, every set of *m* vectors, each with a single scalar value, is turned into a hyper-vector, which points to a place in the *m*-dimensional space. It is then the distance between these points that constitutes our correlation function. Right now, as long as there is one non-missing value, the distance is computed. The distance is divided by the number of non-missing values in a rough attempt at establishing comparability.

The way in which this is turned into a "correlation" type measure is to subtract twice the distance from the maximum distance, and divide this by the maximum distance. Thus if the observed distance is 0, our measure is 1, while if it is the maximum distance, our measure is -1. Of course, you might not have observed any minimum distances of 0; MINIME re-scales so that your minimum distance is treated as zero; NOMINI turns this off.

This has been chosen because two vectors of *M* slope coefficients that point in the same direction but are of different magnitudes seem very different to us. But if you choose to only examine the correlation (equivalent to the angle of these two vectors), you can do this by specifying NOFIXMULT. FIXMULT is the default.

The wrinkle here is that this makes use of the scale of the slope coefficients in each dimension, which in turn is dependent on the underlying coding scale. So it's hard to know how to combine dimensions. One way might be to try to standardize the variation. Z entered in the same

command with CORR will lead FEMA to give all the sets of slopes a mean of 0 and a standard deviation of 1. NOZ will turn this off. A better way seems to be not to try to do work in the full multidimensional space, but for each dimension, to figure out the distance (absolute value of difference) between two places, turn this into a percentile, and then average the percentiles. This is selected by PCT and NOPCT turns this off.

V. WEIGHTS AND TIME

Internal Weighting Scheme [WEIGHT, NOWEIGHT]

It may be that the data are from sets of persons arranged in positions, where different number of persons are present in different positions. You may wish to weight the data according to the number of persons. If you have this "N" data present, FEMA will weight each pairwise observation. If N_i is the number of persons in group i, and N_j is the number of persons in group j, with N^G the total number of positions, then if

$$w*_{ij} = \frac{N_i N_j}{N_i + N_j}$$

and

$$W = \sum_{i,j>i} w*_{ij}$$

FEMA uses weights w_{ij} where

$$w_{ij} = \left(\frac{N^G(N^G - 1)}{2}\right)\left(\frac{w*_{ij}}{W}\right)$$

So the weights are proportional to the first expression but add up to the number of observed pairs.

When you turn on WEIGHT, if you have not already, FEMA will ask you for the N variable. Afterwards, you can turn the weights on and off, but until you FORGET the settings FEMA will not ask you for this information.

External Weighting Scheme [USE]

If you have external pairwise weighting in a relational file, you can specify which variable to take with the USE command. NOWEIGHT will then turn this off.

Time [TIME, NOTIME, MOVE, NOMOVE, SELF, NOSELF, RETAIN, NORETAIN, SUMMARY, NOSUMMARY, *window*]

FEMA allows you to assign a "time" to each observation. If you have a variable named TIME, FEMA will automatically load in this information as the time variable; otherwise, you will need to specify something containing time. This should be in any real number format. After TIME is specified, you can turn off using it with NOTIME. Whenever you call TIME, you are also asked to specify a value of the "*window*" that is used to determine whether two data points are close enough together to be pooled. This should be in the same units as your time variable.

If you have time data, there is a good chance that you'll have the same units measured at different times. We're still struggling with how to best represent this; I think we'll allow for the same ID numbers to be used at different times. In that case, you want to make sure that you do specify TIME even if you don't want to use it. In that case, just give a window large enough to include all pairs. But otherwise, FEMA may be confused…. And we're still working on using TIME for nested data…. Anyway, the NOSELF command means that FEMA will not use the correlation of a case with itself at a different time in its statistics; SELF (the default) changes this.

TIME by itself leads to a single analysis pooling all data points within a time window. If you specify MOVE, whenever you give a DO command, FEMA will conduct some sort of moving average analysis going from the first time to the last. In this case, rather than conduct the analysis over all pairs that are within some time difference from one another, FEMA will successively consider all cases that are within a distance from your first time through your last. Thus if you had observations and times

Observation	Time
1	1
2	1
3	1
4	2
5	2
6	3
7	4
8	4
9	5
10	5

If your "window" was 2, specifying TIME but NOMOVE would lead to a single analysis and display with pairs of observations (1,2), (1,3), (1,4), (1,5), (1,6), (2,3), (2,4), (2,5), (2,6), (3,4), (3,5), (3,6), (4,5), (4,6), (4,7), (4,8), (5,6), (5,7), (5,8), (6,7), (6,8), (6,9), (6,10), (7,8), (7,9), (7,10), (8,9), (8,10), (9,10). If you did MOVE, you would get five analyses, using points

T1: (1,2), (1,3), (1,4), (1,5), (1,6), (2,3), (2,4), (2,5), (2,6), (3,4), (3,5), (3,6), (4,5), (4,6), (5,6).

T2: (1,2), (1,3), (1,4), (1,5), (1,6), (2,3), (2,4), (2,5), (2,6), (3,4), (3,5), (3,6), (4,5), (4,6), (4,7), (4,8), (5,6), (5,7), (5,8), (6,7), (6,8), (7,8).

T3: (1,2), (1,3), (1,4), (1,5), (1,6), (2,3), (2,4), (2,5), (2,6), (3,4), (3,5), (3,6), (4,5), (4,6), (4,7), (4,8), (5,6), (5,7), (5,8), (6,7), (6,8), (6,9), (6,10), (7,8), (7,9), (7,10), (8,9), (8,10), (9,10).
T4: (4,5), (4,6), (4,7), (4,8), (5,6), (5,7), (5,8), (6,7), (6,8), (6,9), (6,10), (7,8), (7,9), (7,10), (8,9), (8,10), (9,10).

T5: (6,7), (6,8), (6,9), (6,10), (7,8), (7,9), (7,10), (8,9), (8,10), (9,10).

! Note that you need to specify TIME before you specify MOVE. Also note that if you are doing a moving analysis, your results file with have written the TIME for any analysis right after the number of the analysis. Also note that only 100 time periods are currently fully supported.

If you specify RETAIN, FEMA will graph the smoothed trend for the last few (currently five) times in the moving window along with the current one; the format is the same as in the KEEP command. This is the default; turn it off with NORETAIN. Also note that the most *recent* line is always in yellow; the other lines are printed in different colors with a legend somewhere showing which line is which time.

If you specify SUMMARY (the default), at the end of the analyses, FEMA will plot change in the overall field statistics over your time period. In this graph, your time points are connected by lines (unsmoothed) to show the temporal trend without obscuring where the observations are. Printed for each time period are the number of valid pairs used to construct the observations, the range of the field effect, the standardized field effect and the field strength. Because the ranges of these are different, FEMA prints the minimum and maximum for the plots separately on the left; the max and min for any statistic are above and below its name, which is written in the same color as the plotted line. A redundant legend is also printed in a place guaranteed to be easy to read.

VI. GRAPHICS

FEMA draws the correlation function as it changes over distance. It also graphs the observed data points. The smoothing routine interpolates for distances in which there are no observations. It does not directly print graphics; if your computer is working well, the Print Screen button should save things to the clipboard; if not, for the main displays, the CAPTURE command writes the image to a file. Finally, it also creates histograms.

Smoothing [BURLAP, LINEN, SILK, CLIP*, NOCLIP, *kernel*]
FEMA presents the data in graphic form smoothed and spread out by distance, interpolating areas in which there are no observations. By default, it does a single moving average smoothing, called "BURLAP." You can specify LINEN for a smoother plot, or SILK for even smoother. Because this smoothing is based on a running average, the values at the ends cannot be based on the same amount of data as those in the middle. CLIP suppresses any smoothing until the window covers a full range of data; NOCLIP turns this off. The width of the moving average is determined by *kernel*. The default is 20, which means that the window is $1/20^{th}$ the size of the entire data distribution.

Setting the Range [CROP, NOCROP*, LOCK*, NOLOCK]
By default, FEMA draws lines that are scaled by distance (either log or linear, see section III) so that the entire horizontal area of the screen is distance, and the correlations are scaled from a minimum of -1 to a maximum of +1. If your actual observed range is smaller than this, you can use CROP to set the vertical boundaries to those that are observed. If you want to turn this off, you specify NOCROP. By default, FEMA will use the same scale for the smoothed and the observed data; if you want to allow the two to vary independently, specify NOLOCK. The axis prints out the values for the smoothed data.

Saving Lines [KEEP, DROP, HIDE, NOHIDE]
You may want to plot the results from more than one analysis at the same time. You can save the results from the most recent analysis by using the KEEP command. You can KEEP up to five previous results. When you graph the next results, all kept results will be plotted unless you specify HIDE. To get rid of saved lines, use DROP. Each time you use DROP, you forget the most recently kept line. To turn HIDE back off, specify NOHIDE. Note that MOVE with RETAIN automatically saves lines (see MOVE).

If you are plotting previous results using KEEP, FEMA will turn off CROP.

Suppressing Main Plots [SHOW*, NOSHOW, RUSH, NORUSH*, SLOW*, FAST]
If you want to skip the main plotting altogether, and just produce summary statistics, ask for NOSHOW, which will remain in place until you specify SHOW. If you are doing a MOVE temporal analysis, and you don't want to see the individual displays for each time, specify RUSH. NORUSH turns this off. Confusingly, you can also move through the plots "FAST" which means that FEMA makes them and erases them in front of you. RUSH pre-empts SLOW or FAST.

Histograms [HISTOGRAM, AGGREGATE, INDIVIDUAL]
You can plot the distribution of variables using HISTOGRAM. Note that if you have *nested* data and you have run REGRESSions, thereby creating group-level data, FEMA will imagine that you are interested in checking these results and will orient to the AGGREGATE data file. You can specify INDIVIDUAL data, but remember that this also affects DISTANCE and CORRELATION.

Comparing Results [CAPTURE, SPIT, NOSPIT]
Some of FEMA's output is in the form of graphics; if you want to make a copy of these in bitmap form, specify CAPTURE during or after any command. The file will be called FEMA-FIG and then have the date and time it was created. Unfortunately, the FORTRAN routine FEMA uses has not really kept up with contemporary displays and you may get a crash notifying you of an out-of-memory error. If this happens, you can temporarily re-set the color resolution or screen resolution of your display to be lower; this will allow FEMA to save a much smaller file. If your monitor is set to 32-bit resolution, and you're not a mantis shrimp, you can't tell the difference anyway. Temporarily going down to 256 colors is actually the best, since FEMA only uses a few simple colors. It leads to a refined bitmap file you can then view against your background of the other 4,294,967,040 colors that FEMA didn't need.

You can also tell FEMA to SPIT the results of the main analyses to the log file; in this case, it writes the distance and the correlation for all pairs of observations, sorted by distance. This is useful if you want to read this in to another program for better graphics.

VII. REGRESS

Analyses [REGRESS, NORMALIZE, ABNORMALIZE, SUPPRESS, NOSUPPRESS, STATS, NOSTATS*, Z*, NOZ, ATONCE, NOATONCE*]

If your data come in nested form, you can use FEMA to compute regression slopes; these are then saved in a separate data file that will be used for the field effect measures; all slopes are normally saved. You can then drop whichever ones you don't want. After selecting REGRESS, you give your dependent variable and then your independent variable. Right now only OLS and logistic models are supported; don't try any others quite yet. Then, when you specify a DO command, FEMA will assume you mean this aggregate data file, until you specify a WIPE which destroys all these data. The exception is that if you are doing SOCIAL distance, FEMA will assume you want to use the individual level data.

For some purposes, you want your slopes transformed to a normal distribution (for example, when small counts are likely to make some of your values extreme). If you specify NORMALIZE, this will lead FEMA to save your results as having a neat little Gaussian shape. If you have specified Z, this will have a mean of 0 and a standard deviation of 1; if you have specified NOZ, the observed mean and standard deviation will be used. To turn this off, specify ABNORMALIZE. (These can be entered on the same command line as REGRESS.) Note that if you have specified NORMALIZE, Z, then the field strength measure should be perfectly correlated with the normalized field measure (or only differs due to missing data); in fact, the field sdtrength should just multiply the standardized field effect by a constant $(2/\pi)^{½} \approx .7979$. You might wonder, why would I want to use the Z option and not retain the information on the distribution? The answer is that probably your distribution was so skewed that there isn't real information here at all. That's why you did this in the first place.

If you have data from multiple times, you can choose whether this normalization is conducted separately within time (NOATONCE, the default) or pooling all cases (ATONCE). You have to have declared TIME to use NOATONCE.

If you specify STATS, FEMA will print information on the distribution for each coefficient. Turn this off with NOSTATS.

! Right now, FEMA expects that you have no "ties," slopes that are the same, when doing the NORMALIZation command. If there are, they'll be treated differently, one put before the other.

When you are running linear models across many groups with smallish N's, in a number of them, the model will be unidentified. FEMA will actually first check for the most obvious cases before attempting to fit a model; thus if you have fewer cases than variables, or no variance on some variables, FEMA will skip even trying to fit the model for this group. But in other cases, it's only after attempting to fit the model that it becomes clear that the model is underidentified for this case. FEMA can warn you each time this happens, or suppress these warnings (the statistics on the number of unidentified models will soon be printed). The default is to SUPPRESS these; use NOSUPPRESS to get the warnings. Note that this default also affects the treatment of such warnings in the PERMUTE command. Whenever the model cannot be fit, FEMA writes missing values for the relevant places in the aggregate file.

If you have unidentified models, FEMA will eliminate this group from consideration in the DO analyses, which means that when it prints statistics on the number of missing observations (say, the number of pairs that don't have a valid correlation function for some analysis), it's only thinking about those groups with *some* valid data here. But if you do a new REGRESS analysis that leads some of these seemingly dropped groups to have valid data, they'll re-appear.

Files [WIPE, SAVE, DELETE, EMPTY, NOEMPTY*]
When you run a regression, FEMA automatically adds your results to a data base that it is constructing at the aggregate level. Thus FEMA now thinks of your data as two structures—the original, individuals nested in groups file, and then the aggregate file. FEMA will construct names based on the root of the variable name, the number of analyses you have done, and whether or not it has been standardized. Thus EDUC17Z indicates that this is from the 17th analysis you have done, it is based on the EDUC variable, and it has been transformed into a Z score. After 99 such analyses, you will need to WIPE the slate clean; you also can run into problems if you have more than a certain number of variables. To get rid of ones you don't want to keep, you use the DELETE command (don't get it confused with the DROP command!). You can also use the SAVE command to store the results as a file. This file can then be read in by FEMA at another time. This file with have the same name as your main (*nested*) data file, but with an 'A' prefix.

By default (NOEMPTY), FEMA does not write to this file information about groups that have no valid aggregated data produced by REGRESS. Change this with EMPTY.

Dealing with the Two Data Sets [AGGREGATE, INDIVIDUAL, PORT]
When you have done a regression, FEMA will automatically assume that any field analyses are to use this aggregated data. However, you can switch back and forth between the individual level data and the aggregated data. AGGREGATE tells FEMA to use the level 2 data, while INDIVIDUAL tells it to use the level 1 data. Whenever you switch from one to the other, FEMA will FORGET things like the distance or correlation function type specified. However, even if INDIVIDUAL is specified, FEMA will assume that DISTANCE, CORRELATION and DO commands refer to the AGGREGATE level.

FEMA will automatically look for variables with the names 'time,' 'lat,' 'lon,' 'x,' 'y,' and 'pos,' and will port any of these over to the aggregate file. FEMA will also automatically count the cases; if you weight, it will use this as the basis for weighting as described above. You can also PORT group-level variables from the individual-level file to the aggregate file. These would be for variables that are contained in the individual-level data, but really pertain to group-level attributes. You can use this if your position variables don't have the default names (e.g., you have 'horiz' and 'vert' in your data instead of 'X' and 'Y'). Note that if you WIPE, you'll need to re-PORT in any variables to a later aggregate data structure.

Collapsing [COLLAPSE, NOCOLLAPSE, NOW, BOTH, NOBOTH*, AUTO*, NOAUTO RESTORE, PERCENTAGE*, NOPERCENTAGE, *radius, pairs, now*]
It is often the case that a model cannot be fit for many of the units that comprise your data due to insufficient sample size or variance within some units. One way to go forwards is to combine some units a priori. Or you can have FEMA trawl through and do this for you via COLLAPSE.

What FEMA does is look at all groups and see which ones are closest to one another. It will then try collapsing those close to one another. If you specify BOTH, it will only collapse groups where both were underidentified; if NOBOTH is specified, it will collapse a pair whenever at least one of the two was underidentified. So FEMA makes successive passes through the data, up to some *radius* that you specify. If you specify NOAUTO (AUTO is the default), FEMA will return control to you after each pass through the data. Run REGRESS again to keep the process going. If you have TIME data in, FEMA will also only collapse cases in which the time is within *now*, which like *window* (see the section on TIME) is in the units of your *time* variable. The default is 0, meaning that only cases at the same time are collapsed. Cases that are of different times that are collapsed are assigned a new time in between the two original.

In each pass, FEMA will COLLAPSE a set number of pairs – that is, given all the pairs under some minimum distance, FEMA will collapse the *pairs* closest, where *pairs* is a number you set in the defaults. Bear in mind that once you collapse two groups, neither will be collapsed with any other during the current pass (since we don't yet know whether the model is now properly identified for this new aggregate). Thus if you set *pairs* very high, you might get some suboptimal aggregation (where you'd rather have thrown #3, #7 and #10 together, but because you first collapsed #3 and #10, #7 ended up collapsed with #12…). But if you set *pairs* too low, the collapsing will take a long time. The default is 5.

Right now, if you are COLLAPSING under NOAUTO, after each (ala carte) pass through the data, FEMA will re-compute the distances between your aggregated areas. But if you are doing AUTO, it will not re-compute until you're all done. Thus if you collapse group 34 into group 2 on the first pass, this combined group may later be collapsed with 15 on the basis of the distance between 34 and 15, not between 15 and the weighted average of 34 and 2. This won't make a difference for most cases. Further, FEMA will make a similar weighted average of *any* existing group-level variables.

You can use COLLAPSE in two ways. If you just specify it before doing some regression, it will turn into a default—until you specify NOCOLLAPSE, FEMA will always COLLAPSE data after a regression. Or you can first run your regression, then specify COLLAPSE NOW.

How FEMA interprets this depends on the way in which you've specified distances. First, you can choose to specify this radius as a PERCENTAGE of the maximum difference; alternately, you can use NOPERCENTAGE (the default) and give an absolute number. In this case, if you are using FLAT distances, give FEMA a number in the same metric as the FLAT coordinates. If you are using GEOgraphic distances (longitude and latitude), give FEMA a number in miles. If you are using POSition, give FEMA a number in the units of that position.

! After FEMA makes its first run through and collapses adjacent points, it will then re-run the models. Note that at this point, FEMA will be **replacing** your aggregate file with a new one; it will automatically save your old file, and you can use RESTORE to return to the original (uncollapsed) file at any time. **However**, each time you run COLLAPSE, you replace the backup file; so if you do two collapsing, RESTORE brings you back to the first collapsing. Always keep a copy of your original data separate! FEMA will also SAVE your main data file;

this means that if you have changes to your data that aren't saved, these are saved with the original file becoming a .BAK backup file. It is this BAK file that will be restored. The key changes here coming from COLLAPSE will pertain to the assignment of persons to groups.

If there are still unidentified groups, FEMA will then redo its algorithm, and so on and so forth, until either there are no unidentified groups, or none of the unidentified groups are within your radius of one another.

When FEMA collapses two groups, it gives them a location that is the weighted average of the locations of the component groups. Remember that group numbers all will change upon aggregation. FEMA will write a list of what it is doing in the log file. For all the other aggregate variables, FEMA also makes a weighted average for the new collapsed group. (If one of the groups has missing values on any of these variables, FEMA just uses the valid value of the other.)

VIII. PERMUTATION TESTS

Model [PERMUTE, DIST, PERCENTAGE, NOPERCENTAGE*, *distance proportion*, *number of permutations*]

FEMA can also be used to determine whether the slopes across groups in a linear model are more dispersed than one might expect under chance sampling. Here you select PERMUTE, give your dependent variable and then your independent variable. Right now only OLS and logistic models are supported; don't try any others quite yet. The PERMUTE option gives you a position of where they observed degree of variance for each variable (and the constant) falls on the distribution that results from permuting people across all groups. The key numbers can be interpreted like p-values but in the opposite direction—a .93 means that the observed data has more variance than 93% of the distribution under equiprobable placement of persons in groups.

If you specify DIST at the same time as the permute command, PERMUTE will only match people within some specified percentage of the maximum distance. You must have already specified a distance metric (see section III). This is set in the defaults section and starts up at 50% if you are using a percentage metric (see section VII).

Statistics [OUTLIER*, NOOUTLIER, BOX, VARIANCE*]

With logistic models being applied to small groups, parameters can easily get very big. This can lead to misleading variances. One possibility would be to use the central range of cases, but another is simply to eliminate the single largest value from each set. Both of these are implemented. The first is BOX, and instead of the variance , we get the range of the central 50% of cases. (Use VARIANCE to switch back to the variance.) The second is OUTLIER; this is the default if LOGISTIC is used, but can be turned off with NOOUTLIER. Leaving OUTLIER on will not affect OLS models. In a nutshell, OUTLIER works well for sporadic problems; if you have more variables you are likely to have more than one nutso value, and then BOX performs much better. Plus, because the distribution is being generated through permutation as opposed to the stupid ole central limit theorem, this ox statistic is 100% as justified as anything else!

Diagnostics [UNID, SUPPRESS*, NOSUPPRESS, STAYERS, BARE]

If some variables do not vary across a certain group, FEMA will simply omit it for the analyses in question; this can either be for the main analyses or for permutations. But beyond this, it may be that in some group or groups the model cannot be computed (usually because there is a linear combination in the variables). FEMA tells you for how many groups this occurred in the main analysis, and how this compares to the permutation results. If you specify UNID, it will also print a histogram with this information. The X value is the number of unidentified groups, and the Y axis is the number of permuted data sets having this value. The observed value is shown in red.

You can have FEMA give you a warning each time there is such an unidentification, or to SUPPRESS such warnings. SUPPRESS is the default; to get warnings, use the command NOSUPPRESS. Note that this also affects the treatment of such cases in the REGRESS command.

Sometimes by chance, a person will be re-assigned to the same group from which she was drawn. FEMA keeps track of this, and also can present the results as a histogram if you specify

STAYERS. There is of course no observed value for this. This makes sense if you are using the DIST option to constrain permutations within a radius. You might want to make sure you aren't forcing most people back into their original groups.

BARE turns off UNID and STAYERS.

Graphics [TRIM, NOTRIM, COMPACT, NOCOMPACT, CAPTURE, REPLOT]
PERMUTE also leads FEMA to show you these distributions in the form of histograms, with the observed data highlighted in red. Because these data often have very long tails (and the extreme values may be due to patterns of missing values in some cases), you can tell FEMA to TRIM off the 10% most extreme cases (highest variance), or the 10 left-most bins (whichever is more). If the observed is greater than this, it will revert to the observed as the maximum. You can turn off TRIM with NOTRIM.

By default, FEMA will squeeze four histograms to a screen at any time. To see only one at a time, use the NOCOMPACT command.

If you want to save the output, use the CAPTURE command. In contrast to the field effect module, here you say capture at the same time as the PERMUTE command. (This is because although it only takes a fraction of a second to repeat a DO command, doing, say, 100,000 logistic regressions takes some time.) So you might say

```
> PERMUTE CAPTURE BOX NOTRIM
```

as a command line.

If you don't realize that you want to save graphics, you can use REPLOT to re-draw a diagram so long as you haven't run any intervening analyses. Thus you can also use:

```
> PERMUTE BOX NOTRIM
> REPLOT CAPTURE
```

Output [RESULTS, NORESULTS*]
If RESULTS is on, the results file will contain the analysis number, the code 2 for permutation tests, and then for every variable (including the constant) its lower bound, its upper bound, its midpoint, its "variance," and the p-value. If BOX is on, the lower and upper bound are set by the proportion of cases used to establish the box, the midpoint is the median, and the "variance" is the range between these points. Otherwise, the midpoint is the mean, and the lower and upper bound are set by subtracting the SD times the square root of 2. The variance is the variance.

IX. ALPHABETICAL LIST OF COMMANDS (* = default).

ABNORMALIZE This turns off NORMALIZE

AGGREGATE* This tells FEMA that when regression results exist at the aggregate level, to use these for field analyses. See INDIVIDUAL.

ATONCE This tells FEMA that when NORMALIZing, to pool data from multiple times.

AUTO* Under COLLAPSE, this means that FEMA will repeatedly reduce until it reaches a stopping point. Turning it off means that control returns to you after each pass through the data.

BARE* This tells FEMA that in the PERMUTE module not to print additional diagnostic histograms.

BOTH This tells FEMA not to COLLAPSE two units unless REGRESS gives missing values for BOTH. The default is NOBOTH.

BOUNDED This tells FEMA that your vectors are bounded between -1 and 1 and to use an absolute-value-of-difference based measure under SINGLE.

BOX This tells FEMA to use the range of the central 50% of cases as opposed to the variance when doing permutation tests. This is increasingly recommended. See VARIANCE.

BURLAP* This tells FEMA to use a one-pass smoothing routine, a simple running average. This is the default.

CAPTURE This tells FEMA to save the graphical results of the current analysis as a bitmap file. This will be in the main directory, with the name FEMA-FIG and then the date and time it was created. The usage is different in the two modules. Also see REPLOT.

CARTESIAN* This tells FEMA that the SOCIAL distance option should be computed according to the Cartesian distance. This is the default for the SOCIAL option.

CLIP* This tells FEMA not to draw smoothed trend lines outside of the area for which full running average data exists.

COLLAPSE This tells FEMA to aggregate groups if necessary to identify a model.

COMPACT* This tells FEMA to put four histograms on a screen instead of just one.

CORR This tells FEMA to re-create the current correlation function. You can use this without changing the current type; for example, if you wanted to change the

variables used to create this function. You can change the correlation type in the same command as you use CORR. So if you had first used a SINGLE vector, then a MULTIPLE method, typing DO CORR SINGLE would lead FEMA to ask you to come up with a **new** variable for your correlation function, while DO SINGLE would revert to the last SINGLE based correlation functions you had used.

CORRHIST This tells FEMA to plot a histogram of the current correlation function defined on pairs.

CREATE This tells FEMA to re-create weights. Thus you could use a similar method, but re-do the weights using different variables.

CROP This tells FEMA when displaying graphically, to adjust the display to focus only on the range of actual variation. This can lead to misleading comparative results, of course.

DEBUG This tells FEMA to print ugly debugging information on the selected commands.

DEFAULTS This tells FEMA to change some numerical defaults. Right now the ones you can change are:

Number of Permutations used by PERMUTE.

Range used for COLLAPSING or PERMUTING

Pairs used for COLLAPSING.

DELETE This leads FEMA to drop a created variable in an aggregate file; these variables are based on regression results.

DIFFER This tells FEMA to create distances on the basis of the absolute value of the difference between observations on some variable in the data set.

DIRECTORY This tells FEMA to give you information on the current directory.

DIST This tells FEMA to re-create the current distance function. You can use this without changing the current type; for example, if you wanted to change the variables used to create this function. You can change the distance type in the same command as you use DIST. So if you had first used a DIFFERence based distance, then a GEOgraphic, typing DO DIST DIFFER would lead FEMA to ask you to come up with a **new** position for DIFFERence based distances, while DO DIFFER would revert to the last DIFFERence based distances you had used.

DISTHIST This tells FEMA to plot a histogram of the current distance function defined on pairs.

DO This tells FEMA to do an analysis of the range of the field effect. Existing settings for the computation of distance and correlation function will be used if nothing else is specified.

DROP This tells FEMA to throw away the most recently saved graphical output.

DUMP This tells FEMA to print results of distance and correlation functions to the log file.

EMPTY This tells FEMA to SAVE information on groups, even if there's no valid results.

EXIT This ends the program.

FAST This tells FEMA when in MOVE to suppress printing detailed numerical results to the screen and to move from one graph to another without waiting for you.

FILE This brings in a new data file.

FIXMULT* This means to use the adapted correlation between multiple slopes when computing correlation coefficients as described in a paper somewhere.

FORGET This tells FEMA to forget previous settings; thus if you did DIFFER to create a distance measure, and then did a second analysis specifying DIFFER, you would get the same distance metric. FORGET tells FEMA that you would want to come up with new measures for everything.

FREE This tells FEMA to free up memory by dropping information on previously held information for some command – if you have also specified WEIGHT it drops weights; if you have specified PERMUTE it drops the previous variance permutation results (so you can no longer REPLOT), if you say RELATE it throws out all relational data.

GEO* This tells FEMA that you want to use a geographic distance based on latitude and longitude variables in your data set.

HAMMING This tells FEMA that the SOCIAL distance option should be computed according to the Hamming distance.

HIDE This tells FEMA not to display any saved lines.

HISTOGRAM This tells FEMA to plot a histogram for some variable in the data.

INDIVIDUAL This tells FEMA to use individual level data for field analyses even when there is a possibility of doing aggregate analyses with nested data.

KEEP This tells FEMA to save the last graphical result in memory to add to future displays.

LINEN This tells FEMA to use a one-pass smoothing routine, a simple running average.

LOCK* If the CROP option is specified, LOCK means that the scales of observed and smoothed data are the same; otherwise they are separately cropped and overlaid.

LOG This tells FEMA to transform distances to a logarithmic metric.

MEMORY This asks FEMA to report the maximum size data that it can currently handle.

MINIME* Re-scales distances in MULTIPLE CORR to take account of the observed minimum. NOMINI turns this off.

MULTIPLE This tells FEMA that your correlation function will be based on multiple slopes.

NOATONCE This tells FEMA when NORMALIZing data from different TIMEs, to have normalizations be within temporal units.

NOAUTO This turns off AUTO.

NOBOTH* This turns off BOTH.

NOCLIP This turns off CLIP.

NOCOLLAPSE* This turns off COLLAPSE.

NOCOMPACT This turns off COMPACT.

NOCROP* This turns off CROP.

NODEBUG This turns off DEBUG.

NODIRECTORY* This turns off DIRECTORY.

NODUMP* This turns off DUMP.

NOEMPTY* This tells FEMA not to SAVE groups with no non-missing data.

NOFIXMULT This turns off FIXMULT and instead computes the cosine correlation for multiple vectors.

NOHIDE* This turns off HIDE.

NOLOCK This turns off LOCK.

NOLOG* This turns off the logarithmic transformation (see LOG).

NOMINI This turns off MINIME

NOOUTLIER* This turns off OUTLIER.

NOPCT This turns off PCT.

NOPERCENTAGE This turns off PERCENTAGE.

NORESULTS* This turns off RESULTS.

NORETAIN This turns off RETAIN.

NORMALIZE This tells FEMA to force the distribution of slopes across regression analyses to take on a normal distribution.

NORUSH* This turns off RUSH

NOSELF This tells FEMA not to use any pairs consisting of the same observation at two times.

NOSHOW This tells FEMA to skip making its main plots of the correlation function.

NOSPIT* This turns off SPIT.

NOSTATS* This turns off STATS.

NOSUMMARY This turns off SUMMARY.

NOSUPPRESS This turns off SUPPRESS.

NOTRIM* This turns off TRIM.

NOW With COLLAPSE, tells FEMA that you are not simply setting the default to COLLAPSE after REGRESS, but to COLLAPSE based on the most recent REGRESSion results.

NOWEIGHT* This turns off any weighting (see WEIGHT).

NOZ Under NORMALIZE, retain old standard deviation and mean. This also works under the MULTI CORR command.

OUTLIER This tells FEMA to eliminate the largest value when computing variances in the PERMUTE module; it is a fairly decent and comparable way of dealing with

some of the big values that may result. If you have more than one or zero big values, you should use BOX instead. If OUTLIER is off, you probably want to do TRIM.

OUTSIDE This tells FEMA to get the distance information from a relational file; the relational file should already be loaded.

PCT This tells FEMA to use percentiles when computing CORR MULTI. NOPCT turns this off.

PERCENTAGE* This tells FEMA to use a percentage of maximum distance as the radius.

PERMUTE This tells FEMA to do a permutation test; this requires individual observations nested within groups.

REGRESS This tells FEMA to run parallel regressions across units in nested data and making a working data file from the results.

RELATE This tells FEMA to open up a relational data file; this could contain distances or weights for pairs.

REPLOT In the permute module, re-plots the most recent histogram results.

RESTORE After using COLLAPSE, this will RESTORE the uncollapsed data, including the aggregate data produced by REGRESS.

RESULTS This leads to a text file of certain results being automatically saved.

RETAIN This tells FEMA to present the last few temporal trends under MOVE.

RUSH This tells FEMA to skip individual graphical displays.

SAVE This tells FEMA to save aggregated data results from regression analyses.

SELF This tells FEMA to treat as valid pairs that consist of the same unit at two times.

SHOW This turns off NOSHOW.

SILK This tells FEMA to use its smoothest smoothing routine.

SINGLE* This tells FEMA that your correlation function will be based on a single vector.

SLOW This tells FEMA during MOVE to show you each set of results separately and wait for your okay to proceed.

SOCIAL	This tells FEMA that the distance will be social distance computed with a set of variables.
SPIT	This tells FEMA to print out the distance and correlation between all pairs of observations.
STATS	Print distribution of coefficients in REGRESS.
SUMMARY	Prints summary of field statistics for MOVE analyses.
SUPPRESS*	FEMA will not print all warnings or errors due to small N's in analyses.
TRIM	This leads histograms to eliminate sparsely populated high tails.
USE	This tells FEMA to use an existing weight function that you have; it requires that you bring in relational data.
VARIANCE	This tells FEMA to use the variance when arranging permutations in terms of more or less dispersed than the observed; this is appropriate for large well behaved samples.
VECTOR*	This tells FEMA that when creating SINGLE based correlations to treat your data as the basis for the construction of vectors.
WEIGHT	This tells FEMA to weight the correlation function between units on the basis of a population variable.
WIPE	This tells FEMA to forget all regression results and return that aggregate data file to empty.
Z	Under NORMALIZE, give new distribution mean of 0 and standard deviation of 1. This also works under the MULTI CORR command.