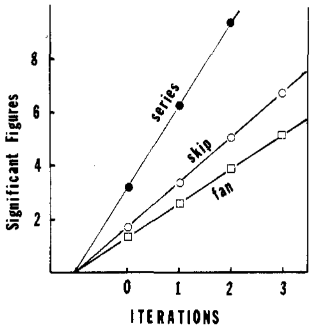

Figure 5. Accuracy of several pair choices for plasma data, significant figures (see text, eq 16) vs. the number of iterations for three possible patterns of pairing the data points.

that finds one variable approaching a monoexponential assymptote with respect to another.

The decay constant is first found with a linear regression of log rate vs. the midpoint of each interval. This decay constant is then used along with the size of each interval to find a more correct time point against which log rate is again regressed, whereupon a better decay constant can be found. The displacement is then solved from the intercept of the log rate plot.

To obtain the end point one returns to the data set with the derived *k* and *D*, using a rearrangement of eq 1 and averaging the solutions found for *E*. If there is any error in *k* and *D*, the points closest to the end point seem to give the best estimate.

The correction technique shows a regular linear relationship between the number of significant figures obtained and the number of iterations done. This shows that the iterative process is regular and predictable but does not include the effect that error in the measurement would have on the number of significant figures. The effect of such error will require statistical analysis of noisy data, or its simulation, in the various contexts where the technique may eventually be applied. The contexts will differ in the number of available data points, their clustered vs. sequential behavior, and the total magnitude of change accross which the measurements are taken.

There are advantages that this technique readily affords. At times one cannot obtain equal time intervals, especially where one dependent variable approaches an exponential asymptote with respect to another dependent variable. This technique makes it possible to process such data in a straightforward analytical manner without requiring computer search methods. In cases where computer search is used, this log rate technique could enhance the quality of an initial guess and decrease the time used by the computer.

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Humic Acid as a Preservative for Trace Mercury(II) Solutions Stored in Polyolefin Containers

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Humic acid prevents significant loss of trace Hg(II) from aqueous solutions stored in commercial polyolefin containers, thus permitting their use for storing natural water samples prior to mercury determination. At a level of 50 mg/L, humic acid reduces losses from 1 ng/mL Hg(II) solutions over 15 days to less than 10%. Humic acid suppresses mercury loss better than do preservatives based on HNO_3 and oxidants, and it is simple to use. It is insensitive to pH between pH 3 and pH 9 and to levels of Ca, Mg, and Fe(III) above those found in most natural waters, and it is equally effective in commercial containers fabricated from a number of polyolefins.

Loss of mercury during storage and shipment constitutes a source of potentially serious error in the determination of traces of mercury in natural water samples. Addition of sufficient nitric acid at the time of collection to reduce the pH to less than 2 is the recommended method for preventing loss of trace mercury from water samples prior to analysis (*1–3*) but this preservation method suffers a severe limitation. When such samples are stored in polyolefin containers, a substantial fraction of the mercury is lost (*4–7*) thus nullifying the advantages of polyolefin bottles in terms of cost, weight, and durability. Clearly, a method to prevent the loss of mercury from natural water samples stored in polyolefin bottles would be of significant value. This paper demonstrates that humic acid achieves this goal. Humic acid is inexpensive, readily available, and suitable for routine use, it eliminates the use of corrosive chemicals, it has a low blank value, and it is substantially more effective than nitric acid.

Humic acid is a complex natural substance whose detailed structure remains controversial, but which is thought to consist of an aromatic core bearing OH and COOH groups and aliphatic side chains with various functional groups (*8–12*).

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