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Lin1_Dif(P,Q,N,N0,Y0) solves first order linear difference equations of the form:

$$Y_{n+1} = P(n)Y_n + Q(n).$$

P, of course, is P(n) and Q is Q(n). N is the index variable. The initial condition is Y=Y0 at N=N0. P,Q,N0, and Y0 can be symbolic; however, you cannot use reserved variable names such as t0 or y1, etc.

For instance, if $Y_{n+1} = 5Y_n + 1$ where $Y_0 = \frac{7}{4}$ then entering lin1_dif(5,1,n,0,7/4) yields

$$\frac{8 \times 5^n - 1}{4}.$$

Or, suppose $P(n) = n$, $Q(n) = (n+1)!$, $N0 = 1$, and $Y0 = 2$. Then, on entering lin1_dif(n, (n+1)!, n, 1, 2) you get

$$\frac{(n^2 + n + 2) \times n!}{2 \times n}$$

Lin1_dif() may produce sums and products that the TI-89 cannot resolve. If you have any questions, I can be reached at PhillipsM@gao.gov.

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