1018-11-134 **Hung-ping Tsao***, 1151 Highland Drive, Novato, CA 94949. *Relationships of powered sums of an arithematic progression among different powers.*

Let S(n;k) be the k-powered sum of a,a+d,a+2d,...,a+(n-1)d. Then the polynomial expression in n of S(n;k) can be obtained via S(n;k)=d[n+(a/d)]S(n;k-1)-[S(1;k-1)+S(2;k-1)+...+S(n;k-1)], which can also be used to prove the closed form for S(n;k) already established [Abstract #1012-11-11] by the mathematical induction on k. The least-square-fit polynomial regression formulas for any equally spaced observed data can be substantially simplified by virtue of relationships among S(n;k)'s. For example, the quadratic formula of this kind can be obtained due to the fact that S(n;4)S(n;2)-S(n;3)S(n;3), S(n;4)S(n;1)-S(n;3)S(n;2), S(n;4)S(n;0)-S(n:2)S(n;2), S(n;3)S(n;1)-S(n;2)S(n;2) and S(n;3)S(n;0)-S(n;2)S(n;1) all have the commom factor d(dn/2)C(n+1,3), with C(n+1,3) being a binomial coefficient. (Received March 06, 2006)