1172-05-7   **Hung-ping Tsao*** (`tsaohp.tsao6@gmail.com`), 1151 Highland Drive, Novato, CA 94949.
Ultimate Generalization of Lah Numbers/(Binomial Coefficients): Sums/(Alternate Sums) of Orthogonal Products of Stirling Numbers. Preliminary report.

We first introduce Stirling and Lah numbers via recursion and express Lah numbers and binomial coefficients as sums and alternate sums of orthogonal products of Stirling numbers of both kinds, respectively. After pointing out that Fibonacci numbers are nothing but upward diagonal sums of Pascal triangle, we generalize the triangular arrays in question from the natural sequence based to arithmetically progressive sequences based and call their upward diagonal sum Fibonacci values. After looking at more triangular arrays based on other sequences such as binomial coefficients and Fibonacci numbers, we eventually conclude that such construction of triangular arrays works with any underlying sequence base.

I found in Wikipedia that Lah numbers are recently used in Steganography with the following references. So my generalization of Lah numbers based on any sequence from those based on the natural sequence must be a significant discovery.

1 Ghosal, Sudipta Kr; Mukhopadhyay, Souradeep; Hossain, Sabbir; Sarkar, Ram (2020). "Application of Lah Transform for Security and Privacy of Data through Information Hiding in Telecommunication". Transactions on Emerging Telecommunications Technologies. doi:10.1002/ett.3984.

2 "Image Steganography-using-Lah-Transform". MathWorks.