

Pascal Triangle/binomial numbers

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From the "upper diamond" of Pascal's Triangle ("tilt your head 45 degrees",
if necessary), construct the square matrices:

$$A_1 = \{ [1] \},$$

$$A_2 = \{ [1, 1], [1, 2] \},$$

$$A_3 = \{ [1, 1, 1], [1, 2, 3], [1, 3, 6] \},$$

etc.

I am trying to show that each of these matrices A_n , $n = 1, 2, 3, \dots$ are positive semi-definite. Calculations suggest that they are. I would appreciate any suggestions or references that may be of help. I am hoping that if I look at things the right way, that it will be obvious.

Thanks,
Bill