

# ABP circuit lower bounds for Nisan-Wigderson polynomial

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*Abstract*—In this paper we show that Nisan Wigderson polynomial, believed to require exponential sized circuits, requires  $\Omega(n^2)$  sized ABP circuits. This lower bound is known for the polynomial  $x^1 + \dots + x^n$ . However we believe that extending the techniques in this paper a lower bound of  $\Omega(n^3)$  can be proved for Nisan-Wigderson polynomial. The ABP model is generalized to a  $k$  sum of products of two set multilinear polynomials. We show  $n^2$  lower bound on  $k$  using algebra techniques. The proof method can be applied to other polynomials which obey certain properties.