The Hadamard Product of two polynomials $P(z) = \sum_{k=0}^{n} p_k z^k$ and $Q(z) = \sum_{k=0}^{n} q_k z^k$ is given by $(P \ast Q)(z) = \sum_{k=0}^{n} p_k q_k z^k$.

For Hardy spaces $H^p$ ($0 < p \leq \infty$) and the space of Mahler measure, $H^0$, in the unit disk $\mathbb{D}$ of the complex plane, we obtained the following estimate:

\begin{equation}
\|P \ast Q\|_{H^p} \leq \|\Theta_n\|_{H^0} \|P\|_{H^0} \|Q\|_{H^p}, \quad 0 \leq p \leq \infty,
\end{equation}

where

$$
\Theta_n(z) := \sum_{k=0}^{n} \binom{n}{k}^2 z^k.
$$

For $p = 0$, equality in (1) is achievable, e.g., taking $P(z) = Q(z) = (1 + z)^n$.

Furthermore,

$$
\lim_{n \to \infty} \|\Theta_n\|_{H^0}^{1/n} = \exp\left(\frac{4G}{\pi}\right) \approx 3.20991230072 \cdots,
$$

where $G = \sum_{m=0}^{\infty} \frac{(-1)^m}{(2m+1)^2}$ is Catalan’s constant.

As an illustration of the method, estimates for the Mahler measure and the $H^p$-pre-norm of the odd and even parts of a polynomial were derived. (Received September 10, 2014)