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Tiefeng Jiang* (tjiang@stat.umn.edu), 313 Ford Hall, 224 Church Street, Minneapolis, MN 55110. *Moments of Traces for Beta-circular Ensembles.*

Let $\theta_1, \dots, \theta_n$ be random variables from Dyson's β -circular ensemble with density $Const \cdot \prod_{1 \leq j < k \leq n} |e^{i\theta_j} - e^{i\theta_k}|^\beta$. For each $n \geq 2$ and $\beta > 0$, we obtain inequalities on $\mathbb{E}[p_\mu(Z_n)\overline{p_\nu(Z_n)}]$, where $Z_n = (e^{i\theta_1}, \dots, e^{i\theta_n})$ and p_μ is the power-sum symmetric function for partition μ . When $\beta = 2$, our inequalities recover an identity by Diaconis and Evans for Haar-invariant unitary matrices. Further, we have

- (a) $\lim_{n \rightarrow \infty} \mathbb{E}[p_\mu(Z_n)\overline{p_\nu(Z_n)}] = \delta_{\mu\nu} \left(\frac{2}{\beta}\right)^{l(\mu)} z_\mu$ for any $\beta > 0$;
- (b) $\lim_{m \rightarrow \infty} \mathbb{E}|p_m(Z_n)|^2 = n$ for any $n \geq 2$ and $\beta > 0$,

where $l(\mu)$ is the length of μ and z_μ is explicit on μ . These results apply to the three important ensembles: COE ($\beta = 1$), CUE ($\beta = 2$) and CSE ($\beta = 4$). The tool is Jack function. This is a joint work with Sho Matsumoto. (Received February 09, 2010)