1116-05-1908   **Ali Kemal Uncu*** (`akuncu@ufl.edu`), University of Florida, Department of Mathematics, 1400 Stadium Road 358 Little Hall, Ganesville, FL 32611. *A New Companion to Capparelli's Identities and Some Combinatorial Inequalities.*

We discuss a new companion to Capparelli's identities. Capparelli's identities for $m = 1$, 2 state that the number of partitions of n into distinct parts not congruent to m, $-m$ modulo 6 is equal to the number of partitions of n into distinct parts not equal to m, where the difference between parts is greater than or equal to 4, unless consecutive parts are either both consecutive multiples of 3 or add up to to a multiple of 6. In this paper we show that the set of partitions of n into distinct parts where the odd-indexed parts are not congruent to m modulo 3, the even-indexed parts are not congruent to $-m$ modulo 3, and $3l + 1$ and $3l + 2$ do not appear together as consecutive parts for any integer l has the same number of elements as the above mentioned Capparelli's partitions of n. In this study we also extend the work of Alladi, Andrews and Gordon by providing a complete set of generating functions for the refined Capparelli partitions, and conjecture some combinatorial inequalities. This work is based on my recent joint work with Alexander Berkovich. (Received September 21, 2015)