1083-05-195 **Rafael S. González D'León*** (dleon@math.miami.edu) and **Michelle L. Wachs**. *On the (co)homology of the poset of weighted partitions.* Preliminary report.

V. V. Dotsenko and A. S. Khoroshkin introduced the poset of weighted partitions Π_n^w to prove Koszulness of the Koszul dual operads $\mathcal{L}ie^2$ and ${}^2\mathcal{C}om$ using the poset technique of B. Vallete. We construct an explicit correspondence between natural generating sets of $\mathcal{L}ie_2(n)$, the multilinear component of the free Lie algebra with two compatible brackets, and $WH^{top}(\Pi_n^w)$, the top Whitney cohomology module of Π_n^w. This induces an $\mathfrak{S}_n$-isomorphism between $\mathcal{L}ie_2(n)$ and $WH^{top}(\Pi_n^w)$ tensored with the sign representation of $\mathfrak{S}_n$. We use our computation of the Möbius invariant of maximal intervals and the fact, shown by H. Strohmayer, that the poset is Cohen-Macaulay to recover the result of Dotsenko, Khoroshkin and F. Liu that $\dim \mathcal{L}ie_2(n) = n^{n-1}$. Our correspondence can be seen as a bicolored version of the correspondence of M. Wachs relating the cohomology of the poset of partitions Π_n and $\mathcal{L}ie(n)$. We introduce then a new bicolored version of the comb basis for $\mathcal{L}ie(n)$ and discuss a bicolored Lyndon basis already introduced by Liu. We also compute some algebraic invariants of Π_n^w such as the rank and characteristic polynomials. (Received August 27, 2012)