

Problem with Vadim Tarin's NP=RP Proof

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The author manages to show that computing the permanent over characteristic 3 of a matrix M can be reduced in polynomial time to computing the permanent of several *duplicated semi-Vandermonde* matrices $W(t)$, where t is a vector of dimension n . The matrix $W(t)$ is similar to the Vandermonde matrix, except (assuming say, $n = 2m$) the rows are upto powers $m - 1$, instead of $2m - 1$, and these set of rows are duplicated.

An interesting and *correct* lemma 5 shows that

$$\text{per}(W(t)) = \frac{\det(t^{\eta_{\dim(t)}})}{\det(\text{Van}(t))}$$

where $\eta_{\dim(t)}$ is the first $\dim(t)$ members of the sequence 0,1,3,4,6,7,...i.e. skipping entries 2 mod 3.

Unfortunately, using this to compute permanent of $W(t)$ runs into problem if t has duplicate entries, as then the determinant of the Vandermonde matrix $\text{Van}(t)$ is zero.

All naive approaches to reduce finding permanent of such a matrix (i.e. one in which $t_i = t_j$ for some $i, j, (i \neq j)$) to one where there are no duplicate entries (and then using lemma 5) leads to exponential time solutions.