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## Mathematics > Number Theory

## A Note on Terence Tao's Paper "On the Number of Solutions to

## 4/p=1/n_1+1/n_2+1/n_3"

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For the positive integer $\$ n \$$, let $\$ f(n) \$$ denote the number of positive integer solutions $\$\left(n \_1, \backslash, n \_2, \backslash, n \_3\right) \$$ of the Diophantine equation $\$ \$\{4 \backslash$ over $n\}=\{1$ lover n_1 $\}+\left\{1 \backslash o v e r n \_2\right\}+\{1 \backslash o v e r$ $\left.n \_3\right\}$. $\$ \$$ For the prime number $\$ p \$, \$ f(p) \$$ can be split into $\$ f \_1(p)+f \_2(p), \$$ where $\$ f \quad i(p)(i=1, \backslash, 2) \$$ counts those solutions with exactly $\$ 1 \$$ of denominators\$n_1,<br>,n_2, ,,n_3\$ divisible by \$p.\$ Recently Terence Tao proved that \$\$ \sum_\{p<x\}f_2(p)\II x\log^2x\log\logx \$\$ with other results. But actually only the upper bound $\$ x \backslash \log { }^{\wedge} 2 x \backslash \log \backslash \log { }^{\wedge} 2 x \$$ can be obtained in his discussion. In this note we shall use an elementary method to save a factor $\$ \backslash \log \backslash \log x \$$ and recover the above estimate.

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