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Solution to Problem 1013.

Proof. Let $x = 11$ and $y = 10^n a_n + 10^{n-1} a_{n-1} + 10^{n-2} a_{n-2} + \cdots + 100a_2 + 10a_1 + a_0$, here $a_i = a_j$ if $i + j = n$. Provided $a_{i-1} + a_i < 10$ for $i = 1, 2, 3, \ldots, n$, then $z = 10^{n+1} a_n + 10^n (a_n + a_{n-1}) + 10^{n-1}(a_{n-1} + a_{n-2}) + \ldots + 100(a_2 + a_1) + 10(a_1 + a_0) + a_0$.

We can also take $x = 22, 33, 44, \ldots, 101, 1001, 10001, \ldots$, etc. Just modify the condition on y a little.

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