Mathematics > Number Theory

## Squares in Polynomial Product Sequences

Paul Spiegelhalter, Joseph Vandehey
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Let $F(n)$ be a polynomial of degree at least 2 with integer coefficients. We consider the products $N \_x=$ |prod_\{1 \e $\left.n \backslash e \mathrm{x}\right\} \mathrm{F}(\mathrm{n})$ and show that $\mathrm{N} \_\mathrm{x}$ should only rarely be a perfect power. In particular, the number of $x \backslash e X$ for which $N \_x$ is a perfect power is $O\left(X^{\wedge} c\right)$ for some explicit $c<1$. For certain $F(n)$ we also prove that for only finitely many $x$ will $N$ _x be squarefull and, in the case of monic irreducible quadratic $F(n)$, provide an explicit bound on the largest $x$ for which $\mathrm{N} \_\mathrm{x}$ is squarefull.

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