# EXISTENCE OF GLOBAL SOLUTIONS
# FOR A SEMILINEAR PARABOLIC CAUCHY PROBLEM

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**Abstract.** In this paper, we consider the parabolic equation $w_t = \Delta w + |x|^l w^p$, $x \in \mathbf{R}^n$, $t > 0$ with $w(x,0) = f(x)$ and show the existence of global solution if $1 + (2 + l)/n < p < (n + 2 + 2l)/(n - 2)$ for each $n \geq 3$ and $l \in (-2, l^*]$, where $l^* = 0$ if $n \geq 4$ and $l^* = \sqrt{3} - 1$ if $n = 3$. In order to prove this result, we need an upper solution for this Cauchy problem. If $f(x)$ satisfies some condition, then we can show the existence of upper solution by investigating the structure of postive radial solutions for related elliptic equation which has a gradient term.