

# A note on the quenching phenomenon of solutions of semilinear parabolic equations with strong absorptions

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**Abstract.** In this paper, we would like to study the quenching phenomenon of solutions to semilinear parabolic equations with strong absorptions:

$$\begin{cases} u_t - \Delta u + u^\beta = 0, & \text{in } \Omega \times (0, \infty), \\ u = 0, & \text{on } \partial\Omega \times (0, \infty), \\ u(x, 0) = u_0(x), & x \in \Omega, \end{cases} \quad (0.1) \quad \boxed{1}$$

and

$$\begin{cases} u_t - \Delta u + u^{-\beta} = 0, & \text{in } \Omega \times (0, \infty), \\ u = 0, & \text{on } \partial\Omega \times (0, \infty), \\ u(x, 0) = u_0(x), & x \in \Omega, \end{cases} \quad (0.2) \quad \boxed{2}$$

where  $\beta \in (0, 1)$ , and  $\Omega$  is a bounded domain with its boundary smooth enough. We show that any solution of the above equations is extinct after a finite time. Furthermore, we point out an estimate on the stopping time of solutions. Our study is inspired by [\[1, 2, 3\]](#) and [their references](#).

## References

- [Anh](#) [1] Nguyen Anh Dao & Jesus Ildefonso Diaz, *A gradient estimate to a degenerate parabolic equation with a singular absorption term: global and local quenching phenomena*, J. Math. Anal. Appl. **437** (2016), 445-473.
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- [DaMon](#) [3] J. Davila & M. Montenegro, *Existence and asymptotic behavior for a singular parabolic equation*, Trans. Amer. Math. Soc. **357** (2004), 1801-1828.