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W. Y. Chan* (wychan@tamut.edu), Department of Mathematics, Texas A&M University -
Texarkana, 7101 University Drive, Texarkana, TX 75503. *Determining Approximated Critical
Domains for Coupled Semilinear Parabolic Equations with a Localized Source.*

Let Ω_1 and Ω_2 be two squared-shape bounded domains in R^2 , and $\partial\Omega_1$ and $\partial\Omega_2$ be their boundary, respectively. Suppose that $(0,0)$ is inside Ω_1 and Ω_2 . In this paper, we study the quenching set of the first initial-boundary value problem of quenching problems for the following coupled semilinear parabolic equations with localized sources:

$$\begin{aligned}\frac{\partial u}{\partial t} &= \Delta u + \frac{1}{1 - v(0, 0, t)} \text{ in } \Omega_1 \times (0, \infty), \\ \frac{\partial v}{\partial t} &= \Delta v + \frac{1}{1 - u(0, 0, t)} \text{ in } \Omega_2 \times (0, \infty), \\ u(x, y, 0) &= 0 \text{ for } (x, y) \in \bar{\Omega}_1 \text{ and } v(x, y, 0) = 0 \text{ for } (x, y) \in \bar{\Omega}_2, \\ u(x, y, t) &= 0 \text{ for } t > 0 \text{ and } (x, y) \in \partial\Omega_1 \text{ and } v(x, y, t) = 0 \text{ for } t > 0 \text{ and } (x, y) \in \partial\Omega_2.\end{aligned}$$

Using a numerical method, we are going to determine the approximated critical domains of the above problem. (Received September 08, 2018)