

# ASYMPTOTIC STABILITY OF TRAVELING WAVES OF A CHEMOTAXIS MODEL WITH SINGULAR SENSITIVITY

HAI-YANG JIN<sup>1</sup>, JINGYU LI<sup>2,3</sup>, ZHI-AN WANG<sup>1</sup>

<sup>1</sup> Department of Applied Mathematics,  
Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong  
<sup>2</sup>Center for Partial Differential Equations,  
East China Normal University, Minhang, Shanghai, 200241, P.R. China  
<sup>3</sup>School of Mathematics and Statistics,  
Northeast Normal University, Changchun, 130024, P.R. China

## Abstract

This paper establishes the nonlinear stability of traveling wave solutions to a chemotaxis model with singular (or logarithmic) sensitivity and its transformed parabolic-hyperbolic system. Depending on the parameter signs, we prove the linear instability of traveling wave solutions using the spectral analysis and nonlinear asymptotic stability of traveling wave solutions with zero end state by the weighted energy estimates, where the latter result solves the open question left in a previous work [T. Li and Z.A. Wang, Nonlinear stability of traveling waves to a hyperbolic-parabolic system modeling chemotaxis. *SIAM J. Appl. Math.* 70:1522-1541, 2009.].