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Existence of global solutions to chemotaxis fluid system with logistic source. (English)

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Summary: We establish the existence of global solutions and L^q time-decay of a three dimensional chemotaxis system with chemoattractant and repellent. We show the existence of global solutions by the energy method. We also study L^q time-decay for the linear homogeneous system by using Fourier transform and finding Green's matrix. Then, we find L^q time-decay for the nonlinear system using solution representation by Duhamel's principle and time-weighted estimate.

MSC:

- 35Q31 Euler equations
- 35Q35 PDEs in connection with fluid mechanics
- 35Q92 PDEs in connection with biology, chemistry and other natural sciences
- 76N10 Existence, uniqueness, and regularity theory for compressible fluids and gas dynamics

Keywords:

chemotaxis system; energy method; a priori estimates; Fourier transform; time-decay rates

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