

红细胞时滞模型的谱及其解的结构

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摘要 研究一个带有时滞的红细胞模型的解展开问题. 对模型在平衡点处线性化, 并利用泛函分析方法, 将线性化模型写成抽象发展方程. 借助半群理论证明了方程的适定性. 对系统算子细致的谱分析, 得到了本征值的渐近表达式. 通过对算子的Riesz谱投影范数的渐近估计, 证明系统的本征向量不能构成状态空间的基, 但我们仍给出了方程的解在平衡点附近按照本征向量的渐近展开.

关键词 [红细胞, 时滞, \$C_0\$ 半群, 解的渐近展开.](#)

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Spectral Analysis and Solution Structure of a Red Blood Cells Model with One Delay

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Abstract In this paper, the expansion of the solution of a red blood cells model with one delay is considered. First, the model near its equilibrium is linearized and the linearized model is rewritten as abstract evolutionary equation. Then, the well-posedness of the equation is obtained by applying the theory of C_0 semigroup. With a detailed spectral analysis, the explicit asymptotical expressions of all eigenvalues are given. Finally, it is shown that the eigenvectors of the system fail to form a basis for the Hilbert state space by estimating the norm of Riesz projection of the system operator. However, the asymptotic expansion of the solution associated with the eigenvectors is given.

Key words [Red blood cell](#) [delay](#) [\$C_0\$ semigroup](#) [asymptotic expansion of solution.](#)

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