

Buslaev, V. S.

Asymptotic comparison of differential equations. (English. Russian original) Zbl 1055.34104
St. Petersburg. Math. J. 14, No. 4, 535-547 (2003); translation from Algebra Anal. 14, No. 4, 1-18 (2002).

The paper deals with the asymptotic behavior as $\varepsilon \rightarrow 0$ of the solutions to the linear differential equation

$$i\varepsilon dx/dt = A(t)x,$$

where $A(t) : \mathbb{C}^2 \rightarrow \mathbb{C}^2$ is a given smooth operator valued function, $t \in [\alpha, \beta] \subset \mathbb{R}$ and $x(t, \varepsilon) \in \mathbb{C}^2$. Let $k(t)$ be an eigenvalue of the operator $A(t)$. The point in which $k(t) = 0$ is called a turning point. The asymptotic behaviour of the solutions to the equation is considered in two cases:

(i) there exists only one turning point in $[\alpha, \beta]$, (ii) there are two turning points in $[\alpha, \beta]$.

The author gives simple asymptotic formulas in these cases.

Reviewer: [Dobiesław Bobrowski \(Poznań\)](#)

MSC:

- 34E20** Singular perturbations, turning point theory, WKB methods for ordinary differential equations Cited in 1 Document
- 34A30** Linear ordinary differential equations and systems
- 34E10** Perturbations, asymptotics of solutions to ordinary differential equations

Keywords:

eigenvectors; turning points