We show that there exists a generalized solution of the considered problem. We also show the uniqueness of the solution of the considered problem in a special case.

1. B. Amman , E. Humbert. *The second Yamabe Invariant,*Journal of Functional Analysis (2006) 235, 377-412

2. K. N. Soltanov. *Some Boundary Problem for Emden-Fowler Type Equations, Function Spaces,* Differential Operators and Nonlinear Analysis, (FSDONA, 2004) May 27-June 2, 2004, Svratka, Czech Republic, 2005, 311-318

3. H. Yamabe. *On a deformation of Riemannian structures on compact manifolds,* Osaka Math. J. 12 (1960) 21-37.

On the Inverse Problem for Dirac Operator

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In this work, we investigation the solution of the inverse problem on two spectra for the regular and singular Dirac operators. In particularly we obtain some theorems concerning the structure of the difference potentials. Before formulating the main result of the this work we must mention that the analogous inverse problems were examined in the works [1,2]

1. B. M. Levitan, I.S. Sargsjan, Sturm-Liouville and Dirac Operators, Kluwer Academic Publisher, Nitherlands, 1991
2. A. Mizutani, On the Invers Sturm-Liouville Problem, Jour. Of the basic Sci. Univ. Of Tokyo, 10 (1984), 319-350

Discontinuous Cycles of Impulsive Autonomous Systems in the Plain

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We consider the problem of existence of discontinuous cycles of two-dimensional linear autonomous impulsive dynamical system of the type

$$\frac{dx}{dt} = Ax + f, \quad \Delta x|_{<a,x>=0} = Bx + c, \quad x, f, c, a \in R^2 \tag{1}$$

when impulsive action happens not at predefined points of time, but when the phase curve intersects the line that is perpendicular to vector a, while phase trajectory shifts to another point of the same line.

For system (1) and the corresponding homogeneous system

$$\frac{dx}{dt} = Ax, \quad \Delta x|_{<a,x>=0} = Bx, \quad x, a \in R^2 \tag{2}$$

we have found all possible periods of discontinuous cycles, relations between elements of matrices A, B and vectors a, c, f when there exist discontinuous cycles. Also we have investigated possible number of impulses during the period, figures of discontinuous closed phase curves and theirs number depending on relations between the parameters of the system.

For system (1) we have considered both cases: noncritical case – when the corresponding homogeneous dynamical system (2) has no T-periodic solutions, and critical – when there are solutions of system (2) with a given period T.

On existence and stability of invariant manifolds

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This talk is devoted to sufficient conditions establishment for asymptotic stability of invariant manifold of impulsive system of differential equations defined in direct product of m-measurable torus T^m and n-measurable Euclidian space. Particularly systems which elements have specific properties on ω-limit set of positive semi-trajectory $\varphi_t(\varphi)$, $\varphi \in T^m$, $t \in [0, +\infty)$ of solution of equation $\dot{\varphi} = a(\varphi)$, $\varphi_t(\varphi)|_{t=0} = \varphi$ are investigated. We consider system

$$\dot{\varphi} = a(\varphi), \ \varphi \in T^m,$$

$$\dot{x} = A_0(\varphi)x + A_1(\varphi, x)x + f(\varphi), \ \varphi \notin \Gamma,$$
$$\Delta x|_{\varphi \in \Gamma} = B_0(\varphi)x + B_1(\varphi, x)x + g(\varphi),$$

where $\Gamma = \{\varphi \in T^m : \Phi(\varphi) = 0\}$, $\Phi(\varphi)$ - continuous scalar 2π-periodic with respect to each variable φ_j, $j = 1, ..m$ function, in case

$$A_0(\varphi)|_{\varphi \in \Omega} = \tilde{A}, \ B_0(\varphi)|_{\varphi \in \Omega} = \tilde{B},$$

where $\Omega = \bigcup_{\varphi \in T^m} \Omega_\varphi$, Ω_φ – ω-limit set of positive semi-trajectory $\varphi_t(\varphi)$, $\tilde{A}$ and $\tilde{B}$ are constant matrices. Sufficient conditions for asymptotic stability of invariant