MELNIKOV FUNCTION AND LIMIT CYCLES OF DISCONTINUOUS SYSTEMS WITH n PIECES

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Abstract. In this seminar will be exhibit explicitly the first order Melnikov function for the piecewise smooth vector fields in the case where the domain is decomposed in n regions limited by half-lines r_i and r_{i+1} emanating from the origin, with $i = 1, \ldots, n$ and $r_{n+1} \equiv r_1$. In each of the n regions, we consider a non-Hamiltonian system Z^i given by

$$Z^i(x,y) = \begin{cases} \dot{x} = \dfrac{H^i_y(x,y)}{R^i(x,y)} \\ \\ \dot{y} = -\dfrac{H^i_x(x,y)}{R^i(x,y)} \end{cases}$$

where H^i, R^i are C^r functions. In the particular case where $H^i(x,y) = \frac{1}{\lambda_i m_i}\left(\frac{\alpha_i x^2 + \beta_i y^2}{2}\right)^{m_i}$ and $R^i(x,y) = 1$, polynomial perturbations are considered and a sharp upper bound of the number of limit cycles is obtained.

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