Melnikov like function for 3-dimensional piecewise smooth vector fields

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Abstract: We consider a 3–dimensional piecewise smooth vector fields with two zones separated by a hyperplane Σ which admits an invariant hyperplane Ω transversal to Σ containing a period annulus A fulfilled by crossing periodic solutions. For small discontinuous perturbations of these systems we develop a Melnikov like function to control the persistence of periodic solutions contained in A. We provide normal forms for the piecewise linear case. Finally we apply the Melnikov like function to study the number of limit cycles that bifurcate from A by small perturbations of the given normal forms.