











## 5 Conclusion

We enlarge the study of the bifurcation diagram of saddle/spiral BLDS to saddle/source BLDS. In particular, being  $\tau$  the trace of the source, we precise the variation of the interval of values  $0 < \tau < \tau_H$  for which structurally stable finite periodic orbits appear: it converges to 0 if  $T \rightarrow 0$ , and to  $0 < \tau < 2\sqrt{\Delta}$  when  $T \rightarrow -\infty$ , where  $T$  is the trace of the saddle and  $\Delta$  is the determinant of the source (assumed fixed).

**Acknowledgements:** The research is supported by DGICYTMTM2011-23892 (first and second author) and TIN2014-52211-C2-1-R partially supported by the Spanish Ministerio E&C and FEDER founding (third author).

### References:

- [1] J. Artes, J. Llibre, J.C. Medrado and M.A. Teixeira, Piecewise linear differential systems with two real saddles, *Math. Comput. Simul.* 95, 2013, pp. 13–22.
- [2] K. Camlibel, M. Heemels and H. Schumacher, Stability and controllability of planar bimodal linear complementarity systems, *Proc. IEEE Conf. Decis. Control*, 2003, pp. 1651–1656.
- [3] M. Di Bernardo, D.J. Pagano and E. Ponce, Nonhyperbolic boundary equilibrium bifurcations in planar Filippov systems: a case study approach, *Int. J. Bifurcation and Chaos* 18, 2008, pp. 1377–1392.
- [4] J. Ferrer, D. Magret and M. Peña, Bimodal piecewise linear systems. Reduced forms, *Int. J. Bifurcation and Chaos* 20, 2010, pp. 2795–2808.
- [5] J. Ferrer, D. Magret and M. Peña, Differentiable Families of Planar Bimodal Linear Control Systems, *Math. Probl. Eng.*, 292813, 2014, pp. 1–9.
- [6] J. Ferrer, M. Peña and A. Susin, Structural stability of planar bimodal linear systems, *Math. Probl. Eng.*, 892948, 2014, pp. 1–8.
- [7] J. Ferrer, M. Peña and A. Susin, Bifurcation diagram of saddle/spiral bimodal linear systems, *submitted to Int. J. Bifurcation and Chaos*.
- [8] E. Freire, E. Ponce, F. Rodrigo and F. Torres, Bifurcation sets of continuous piecewise linear systems with two zones, *Int. J. Bifurcation and Chaos* 8, 1998, pp. 2073–2097.
- [9] E. Freire, L. Pizarro and A.J. Rodriguez-Luis, Numerical continuation of homoclinic orbits to non-hyperbolic equilibria in planar systems, *Nonlin. Dyn.* 23, 2000, pp. 353–375.
- [10] J. Llibre, M. Ordonez and E. Ponce, On the existence and uniqueness of limit cycles in planar continuous piecewise linear systems without symmetry, *Nonlin. Anal.* 14, 2013, pp. 2002–2012.
- [11] J. Sotomayor and R. Garcia, Structural stability of piecewise-linear vector fields, *J. Diff. Eqs.* 192, 2003, pp. 553–565.
- [12] B. Xu, F. Yang, Y. Tang and M. Lin, Homoclinic bifurcations in planar piecewise-linear systems, *Discr. Dyn. Nature and Society*, 732321, 2013, pp. 1–9.