ABSTRACT

We consider parameter-dependent, continuous-time dynamical systems under discretizations. It is shown that fold-Hopf singularities are $O(h^p)$-shifted and turned into fold-Neimark–Sacker points by one-step methods of order p. Then we analyze the effect of discretizations methods on the local bifurcation diagram near Bogdanov–Takens and fold-Hopf singularities. In particular, we prove that the discretized codimension one curves intersect at the singularities in a generic manner. The results are illustrated by a numerical example.