The period function's higher order derivatives

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We prove a formula for the n-th derivative of the period function T in a period annulus of a planar differential system. For $n = 1$, we obtain Freire, Gasull and Guillamon formula for the period's first derivative [1]. We apply such a result to hamiltonian systems with separable variables and other systems. We give some sufficient conditions for the period function of conservative second order O.D.E.'s to be convex.

References

[1] E. Freire, A. Gasull, A. Guillamon, *First derivative of the period function with applications*, J. Differential Equations, **204** (2004), 139 – 162.