

Our purpose is not only to establish a representation of close-to-equilibrium solutions of systems of differential equations modelling n -dimensional conservative oscillators ($n \geq 2$), but also to obtain such representation in explicit form from the initial data. It is known that, even when such solutions are analytical or periodic, the coefficients of the corresponding series developments can be almost always obtained by means of numerical integration only. Here we followed a different approach. We developed a method to obtain a representation of the close-to-equilibrium solutions by means of semitrigonometric polynomials, given in closed form, using integration of functions of the same kind. The main feature of the presented method is that sufficient conditions are provided to define the radius of the neighborhood of the equilibrium point where such representation holds. Then the effectiveness of the method is tested applying it to some significant examples.