

## **Optimized hybrid methods for solving oscillatory second order initial value problems**

### **ABSTRACT**

Two-step optimized hybrid methods of order five and order six are developed for the integration of second order oscillatory initial value problems. The optimized hybrid method (OHMs) are based on the existing nonzero dissipative hybrid methods. Phase-lag, dissipation or amplification error, and the differentiation of the phase-lag relations are required to obtain the methods. Phase-fitted methods based on the same nonzero dissipative hybrid methods are also constructed. Numerical results show that OHMs are more accurate compared to the phase-fitted methods and some well-known methods appeared in the scientific literature in solving oscillating second order initial value problems. It is also found that the nonzero dissipative hybrid methods are more suitable to be optimized than phase-fitted methods.