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# Algebraic methods for the identification problem with short arcs of observations

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**Abstract.**

The identification problem of short arcs of asteroid observations is related with the determination of the orbits of the observed asteroids. Recently this problem has been faced with algebraic methods using the first integrals of Kepler's problem. These methods allow us to solve the problem in an efficient way, keeping under control also alternative solutions, that may occur. However, the huge and continuously increasing amount of data produced by the new asteroid surveys suggests us to search for new algorithms, with shorter computation times.

In this communication I'll review the known methods Gronchi et al. (2010), Gronchi et al. (2011), that lead to polynomial equations of degree 48 and 20 respectively. Then I'll present a new algorithm Gronchi et al. (2015), that we are currently studying, allowing to deal with this problem with a polynomial of degree 9, thus decreasing the computation times in a significant way. Finally, I'll show some examples of computation of asteroid orbits using these methods.

## References

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