

# Operator Splitting and Alternating Process

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Operator splitting is a widely and successfully used method in numerical analysis. It helps us when we have a very complicated Cauchy-problem, which we want to analyse. By using operator splitting, we get a series of easier Cauchy-problems which are linked through their initial conditions. By applying this method it is significantly easier to solve the problem of finding the numerical solution of the original problem.

The two most popular splitting methods are the sequential splitting (it is a first order method) and the Strang-Marchuk splitting method (it is a second order method). In this talk we analyse the relationship between these two methods, and analyse the following main question: how can we get from first order splitting methods to second order splitting methods. The answer is what we call "alternating" splitting. Furthermore, in the case of second-order methods, we also use the alternating splitting and analyse it.

## References

- [1] István Faragó, Ágnes Havasi - *Operator splittings and their applications*, Nova Science Publishers (2009)
- [2] Lívia Boda - *Investigation of different operator splitting methods*, Annales Univ. Sci. Budapest, Sect. Math. 63 (2020), 133-152