

Composition of two forward stable algorithms: When is it forward stable?

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Stability of algorithms is a fundamental concept in numerical analysis, akin to the importance of continuity of functions in mathematical analysis. A key property of continuity is that the composition of two continuous functions is always continuous.

Can the same be said of the composition of two stable algorithms? The answer is generally negative if one considers, for example, backward stability. For forward stability, by imposing some relatively mild assumptions on the functions to be approximated by stable algorithms, we can discover a partially positive answer. I plan to discuss how these ideas can be formalized and made mathematically rigorous.

The talk is based on joint work with Carlos Beltrán (Santander) and Nick Vannieuwenhoven (Leuven).