



**The Hong Kong Polytechnic University
Department of Applied Mathematics**

Colloquium

Resonances as a Computational Tool

By

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Abstract

In recent years, a large toolbox of numerical schemes for dispersive equations has been established, based on different discretisation techniques such as discretising the variation of constants formula (e.g., exponential integrators) or splitting the full equation into a series of simpler subproblems (e.g., splitting methods). In many situations these classical schemes allow a precise and efficient approximation. This, however, drastically changes whenever non-smooth phenomena enter the scene such as for problems at low-regularity and/or with high oscillations. Classical schemes fail indeed to capture the oscillatory nature of the solution, a fact that leads to severe instabilities and loss of convergence. In this talk I present a new class of resonance based schemes. The key idea in the construction of these new schemes is to tackle and deeply embed the underlying structure of resonances into the numerical discretisation. As in the continuous case, these resonances are central to structure preservation and provide the new schemes with strong geometric properties at low regularity. This work is funded in part by the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme.

Bibliography

Prof. Schratz received her PhD in 2012 from University of Innsbruck, Austria, and then worked in Karlsruhe Institute of Technology as a Junior Professor from 2013. Now she is a full professor at Laboratoire Jacques-Louis Lions, Sorbonne Université, Paris. Prof. Schratz's research interest is numerical solution of partial differential equations. She has received many honors in the community of computational mathematics. For example, she was a plenary speaker in the famous SCICADE conference at Austria in 2019. She will be a plenary speaker at the congress "30 Years of Acta Numerica (2021)", and also a plenary speaker at the 40th European Dynamic Days Conference (2021).

Date : 26 August, 2020 (Wednesday)

Time : 16:00-17:00 (Hong Kong Standard Time GMT +8)

Venue : Online Talk via Zoom(Meeting ID: 929 3850 6451)

Click to join : <https://polyu.zoom.us/j/92938506451>

* The Talk will be given in English.



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