
Applied Mathematics Seminar



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Overshooting Tipping Point Thresholds in A Changing Climate

Paleo-records suggest that the climate system has tipping points, where small changes in forcing cause substantial and irreversible alteration to Earth system components called tipping elements. As atmospheric greenhouse gas concentrations continue to rise due to fossil fuel burning, human activity could also trigger tipping. These would be difficult for society to adapt to. Previous studies report low global warming thresholds above pre-industrial conditions for key tipping elements such as ice-sheet melt. If so, high contemporary rates of warming imply that the exceedance of these thresholds is almost inevitable. It is widely assumed that this means we are now committed to suffering these tipping events. I will show that this conventional wisdom may be flawed, especially for slow onset tipping elements in our rapidly changing climate. We have recently developed theory that indicates a threshold may be temporarily exceeded without prompting a change of system state, if the overshoot time is short compared to the effective timescale of the tipping element. To demonstrate this, I will consider transparently simple models of tipping elements with prescribed thresholds, driven by global warming trajectories that peak before returning to stabilise at 1.5°C of global warming.

Thursday, 11.02.2021 · 12pm online (via MS Teams)
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