EINLADUNG
zum
ZIH-SEMINAR

Titel: How Fast Can Random Walkers Spread Under Strict Resource and Time Constraints?

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Kurzfassung:

The talk addresses some of the fundamental questions related to random walk:
- Can we design a fast and efficient random walk, i.e. which maximize both coverage and efficiency simultaneously?
- If that is possible, what random walk strategy can achieve it?

The answers are not known, even for the simple regular topology of a Euclidean grid. Random walk has been thoroughly studied in the domain of physical sciences, where the speed of the walk is the primary concern. However, in recent years, random walk has been widely used in the domain of distributed systems e.g. unstructured search, information dissemination etc. In such applications, each hop of a random walker consumes some bandwidth which is a valuable resource and therefore, needs to be used judiciously. Hence the random walk phenomena have to be probed from quite a different perspective with an objective to ensure both speed and efficiency. An inherent trade-off between speed and efficiency makes the problem non-trivial.

It will be shown that a regulated proliferation-based random walk strategy essentially fulfils the objective and the optimal proliferation rate is estimated being inspired by the study of walker dynamics on the underlying topology. Finally, as an application, we will show how the above study significantly impacts the design of search schemes for large scale unstructured peer-to-peer (P2P) networks with strict resource (bandwidth) and Quality-of-Service (latency) constraints.

Ort: **Informatik-Neubau E08**
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gez. Prof. Dr. Wolfgang E. Nagel