MIT
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& The Theory of
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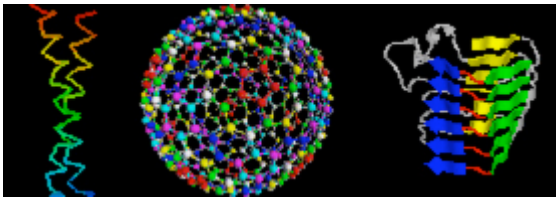

Bioinformatics Seminar

Speaker: Pierre Nicodeme, (CNRS) Laboratoire d'Informatique, LIX, Ecole Polytechnique, and Algorithms Group of INRIA-Rocquencourt Palaiseau (FRANCE)
Title: Asymptotic Average Profiles, from Tries to Suffix-trees.
Date: Monday, 22 May 2006
Time & Location:
Refreshments: 11 am in the Theory of Computation Lab at MIT's Building 32, Stata Center Room G-575
Talk: 11:30 am the Theory of Computation Lab at MIT's Building 32, Stata Center, Room G-575
URL: http://www-math.mit.edu/compbiosem/

Abstract:

We build upon previous work of Julien Fayolle (2004) and Park and Szpankowski (2005) to study asymptotically the average internal profiles of tries and of suffix-trees. The binary keys and the strings are built from a Bernoulli source (p,q). We consider the average number of internal nodes at depth $k=O(\log(n))$ of a trie whose number of input keys (i) is a fixed number n or (ii) follows a Poisson law of parameter n. In both cases we obtain a summation formula with 2^k terms; there is an excellent agreement of the fixed case formula for the trie and simulations for a suffix-tree with an equivalent number of keys. When n and k tend to infinity, we get rid of the summation in the Poisson case by Mellin transform. The inverse Mellin transform is performed by a saddle-point integration and depoissonization by a Ramanujan expansion. This gives, for the trie, (a) an asymptotic estimate for the average profile in the Poisson model, (b) an asymptotic bound of the difference between the fixed case and the Poisson case. We end the proof by asymptotically bounding the difference of the profile of trie in the Poisson model and the suffix-tree.

The seminar is co-hosted by Professor Peter Clote of Boston College's Biology and Computer Science Departments and MIT Professor of Applied Math Bonnie Berger. Professor Berger is also affiliated with CSAIL & HST.

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