

Chromatic Polynomials in Small Space – Performance in Practice

Mats Rydberg*

February 6, 2014

Abstract

The *chromatic polynomial* $\chi_G(t)$ of a graph G on n vertices is a univariate polynomial of degree n , passing through the points $(q, P(G, q))$ where $P(G, q)$ is the number of q -colourings of G . In this paper, we present an implementation of an algorithm by Björklund, Husfeldt, Kaski and Koivisto that computes $\chi_G(t)$ in time $O^*(2^n)$ and space $O^*(1.2916^n)$. We compare the performance of two different core libraries to each other and show our performance against an implementation done by Haggard, Pearce and Royle from 2010. We also present the chromatic polynomials for a small Queen graph and a certain graph specified by Hillar and Windfeldt.

*Master's Thesis student at the Department of Computer Science, Faculty of Engineering (LTH) at Lund University, Lund, Sweden. E-mail: `dt08mr7@student.lth.se`. This work was conducted as a part of the authors Master's Thesis project. Supervisor: Thore Husfeldt, prof. in Comp. Science at LTH.