Review Article

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Appendix Text

Appendix B

Axiom System

Axiom 1

On 2D plane or spherical surface, any planar graph without cut links and loops is standard graph SG(n) or sub-graph SG(n') of SG(n).

Theorem System

4-3CP Conjecture: ∀ standard graph SG, J(m) is the boundary of SG, let Y is the colouring solution set family of J(m), {J'(m)} is sub-bounds set of J(m), Y can make:

1) $|Y| \leqq 4$,
2) J(m) be 3CP,
3) {J'(m)} be 3CP,
4) $\exists a3-coloursolutionset3Y(J'(m))and\{\overline{J}'(m)\}be3CP$,
5) Let $x, p_1, p_2 \in J'(m)$, link $x-p_1, x-p_2$ form sub-bounds $J'_1(x-p_1), J'_2(x-p_2)$, and $\overline{J'_1+J'_2}$, if x scans on $p_1 \to p_2, \exists 3Y(J'_1+J'_2)$ and $\overline{J'_1+J'_2}$ is 3CP.

Inference System

Inference 1: If the bound J(m) is AP, the sub-bounds sets {J(m')} of J(m) must be AP and independent with each other.

Inference 2: If bound J(m) is 4-3CP, J(m) can be extended infinitely by e(+, pi) and e(-, pi).

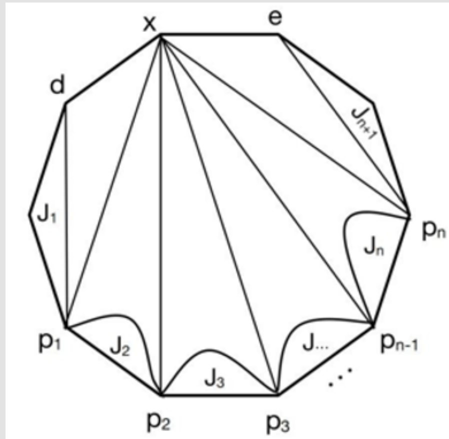
Inference 3: The colouring solution set {Y(n)} of standard graph SG(n) is also the solution set of sub-graph SG(n') of SG(n).

Inference 4: The element e can be extended infinitely outward and inward by e(+, pi) and e(-, pi), and the outward and inward colouring solution are independent.

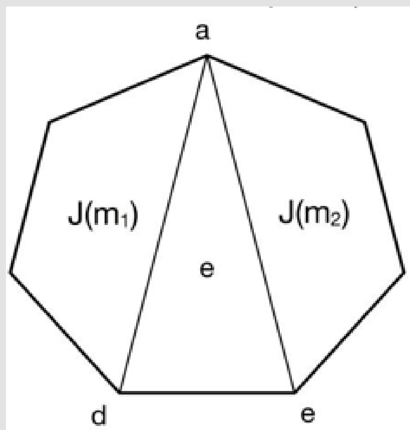
Appendix C

Two Important Methods

1. Points Scanning Method: we set a bound J(m) and a point $x \in p_m$, let $x \notin P_n, P_n \subset P_m, P_n = \{P_1, P_2, P_3, \ldots, P_n, d, e\}(d-x, e-x), m \geqq 3, 0 \leqq n \leqq m-3$, link x with P_n, the bound J(m) is AP if and only if ∀ P_n, the sub-bound $J_1, J_2, J_3, \cdots, J_{n+1}$ are AP (Appendix Figure 2). The all link states number of this structure is $C(|J_1|-$ üĳü $C(|J_2|- \ )\times C(|J_3|- \ )\times \ \times C(|J_{n+1}|- \ )$
2. Links Scanning Method: we set bound J(m), let $a, d, e(d-e) \in P_m, m \geqq 3, a \neq d, a \neq e$, form an element e(ade) and com-bound $J(\overline{e}) = J(m_1) + J(m_2)$, the bound J(m) is AP if and only if ∀ a, the com-bound $J(\overline{e})$ of e(ade) is AP (Appendix Figure 3). The all link states number of this structure is $C(m_1-2)\times C(m_2-2)\cdot$



Appendix Figure 2: J(m) Points Scanning Method.



Appendix Figure 3: J(m) Links Scanning Method.

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