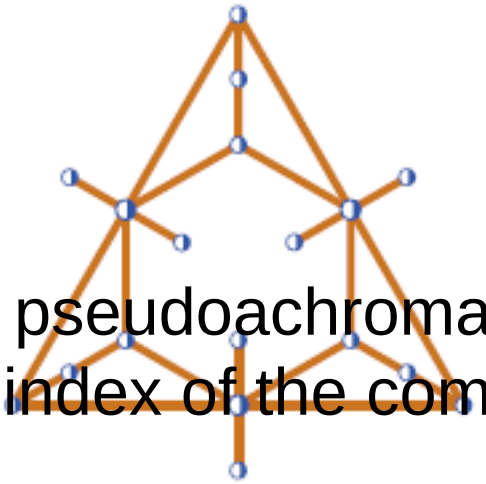
Bled'11 - 7th Slovenian International Conference on Graph Theory



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On the pseudoachromatic and achromatic index of the complete graph

Content :

Let G a simple graph. A colouring of its vertices
$\varsigma:V\rightarrow\{1,...,k\}$
is called \emph{complete} if each pair of different colours appears
in a edge. The \emph{pseudoachromatic number} $\psi(G)$ is the maximum
k for which there exist a complete colouring of G. If the colouring
is required also to be proper (i. e., that each chromatic class is
independent), then such a maximum is know as the \emph{achromatic
number} and it will be denoted here by $\alpha(G)$.

We are mainly interested in the pseudoachromatic number
$\psi(n):=\psi(L(K_{n}))$ of the complete graph's line graph -also
know as the \emph{pseudoachromatic index} of the complete graph- and
its relation with the \emph{achromatic index} $\alpha(n):=\alpha(L(K_{n}))$.

In this talk, we expose the principal motivation of this research, a deep result
due to Bouchet in 1978: Let q be and odd natural
number, and let $m=p^{2}+p+1$. A projective plane Π_{p} of order
p exists if and only if $\alpha(m)=pm$.

Also, we expose our work made in this direction:\\
In a recently paper, my coauthors proved that $\psi(n)=q(n+1)$ when
$n=q^{2}+2q+2$ and $q=2^{\gamma}$ for $\gamma\in\mathbb{N}$ using
also the properties of the projective planes.

Now, we have shown that $\psi(n-a)=\alpha(n-a)=q(n-2a)$ when $n=(q+1)^{2}$,
$q=2^{\gamma}$ for $\gamma\geq2$ and $a\in\{0,1,2\}$ using also projective
planes.

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