

# Research Notes - $k$ -critical graphs

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2009/03/13

Let  $G$  be a  $k$ -critical graph.

**Definition.** We define the high portion ( $H$ ) of the graph as those vertices with degree  $\geq k$ . We define the low portion ( $L$ ) as those vertices with degree  $k - 1$ .

**Theorem.** (*Gallai*): *The block of  $L$  are odd cycles or cliques.*

*Proof.* Consider an induced cycle, we can show it must be two coloured, and so it is odd. We can also show that any even cycle must contain a cord.

□