1060-05-113 **Jicheng Ma*** (`j.ma@math.auckland.ac.nz`), Department of Mathematics, University of Auckland, Private Bag 92019, Auckland, New Zealand. *Cubic graphs with diameter k.*

The degree/diameter problem is to determine the largest graphs of given degree and diameter. The general upper bound for such graphs is the Moore bound, denoted $M_{d,k}$. We consider cubic graphs. Finding better upper bounds for the maximum number of vertices, is an important field of research.

Among cubic graphs, only the Petersen graph achieves the Moore bound. Define a $(3,k,\varepsilon)$-graph to be a cubic graph with diameter k and $M_{3,k}-\varepsilon$ vertices, where ε is called the *defect*. Finding $(3,k,\varepsilon)$ -graphs helps reduce the upper bound. It is known that the (3,3,2)-graph and the (3,4,8)-graph are optimal graphs.

There are many different ways of constructing large graphs, such as by use of *Replacement Product, Graph lifting, Cayley graphs*, etc.

We try to prove that $(3,k,\varepsilon)$-graphs do not exist for larger values of ε. For example, it is known that for $k \geq 4$ and $\varepsilon = 2,4,6$, there are no $(3,k,\varepsilon)$-graphs.

I will discuss using *Graph lifting* to find larger cubic graphs. To find a larger covering graph, the choice of proper base (quotient) graph and voltage group is very important. Also I will talk about some properties of (3,k,6)-graphs for $k \geq 5$. (Received March 25, 2010)