

Meeting: 1002, Pittsburgh, Pennsylvania, SS 2A, Special Session on Convexity and Combinatorics

1002-52-184 **Andras Bezdek*** (bezdean@auburn.edu), Department of Mathematics, Auburn University,
Auburn, AL 36849-5310. *On the number of mutually touching cylinders*. Preliminary report.

The following problem was posed by Littlewood in 1968: What is the maximum number of congruent infinite circular cylinders that can be arranged in R^3 so that any two of them are touching? Is it 7? This problem is still open. The analogous problem concerning circular cylinders of finite length became known as a mathematical puzzle due to a popular book of Gardner. Find an arrangement of 7 cigarettes so that any two of them touch each other. The question whether 7 is the largest such number is open. A very large bound concerning the above question on infinite circular cylinders, expressed in terms of various Ramsey constants was found by the author in 1991. The bound was so large that it merely showed the existence of a finite bound. In this talk we use a different approach to show that at most 24 congruent infinite circular cylinders can be arranged so that any two of them are touching. We also address the problem when the cylinders are not necessarily congruent. (Received September 14, 2004)