On the Folkman Number $f(2,3,4)$

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Let $f(2,3,4)$ denotes the smallest integer n such that there exists a K_4–free graph of order n, for which any 2–coloring of its edges yields at least one monochromatic triangle. It is well–known that such a number must exist. The best known upper bound, provided by J. Spencer, says that $f(2,3,4) < 3 \cdot 10^9$. In this talk, we will discuss a computer assisted proof (using semidefinite programming) showing that $f(2,3,4) < 130\,000$. Our proof as well as Spencer's proof is based on an idea of Goodman. We will also generalize this idea giving a necessary and sufficient condition for a graph G to yield a monochromatic triangle for every edge coloring.

This is joint work with Vojtěch Rödl.