UNIVERSITÄT DES SAARLANDES

Problem Set 10

Topological Methods in Geometry

SS 2011

Problem 1. Find an example of a simplicial $\mathbb{Z}_2$-complex L_0 and a $\mathbb{Z}_2$-subcomplex where Sarkaria's inequality is strict.

Problem 2. Let $(P_1, \preceq_1)$ and $(P_2, \preceq_2)$ to posets. A mapping $f : P_1 \to P_2$ is called monotone if $x \preceq_1 y$ implies $f(x) \preceq_2 f(y)$. Prove that every monotone mapping is also a simplicial mapping from $V(\Delta(P_1))$ to $V(\Delta(P_2))$.

Problem 3. Let K_1 and K_2 be simplicial complexes. Consider an arbitrary mapping f that assigns to each simplex $F \in K_1$ a simplex $f(F) \in K_2$ (f is not necessarily induced by a mapping of vertices), and suppose that if $F' \subseteq F$, then also $f(F') \subseteq f(F)$. Then f can be regarded as a simplicial mapping of $sd(K_1)$ into $sd(K_2)$.