Examples of Upper Semi-continuous Collections.

Unless otherwise stated, we assume the usual (metric) topologies on the spaces.

Example 1. Let $X = [0,1] \times [0,1]$; $G = \{\{x\} \times [0,1] |\ x \in [0,1]$. Show that G is upper semi-continuous and that X/G is homeomorphic to $[0,1]$.

Example 2. Let $X = (0,1) \times (0,1)$; $G = \{\{x\} \times (0,1) |\ x \in (0,1)$. Show that G is not upper semi-continuous.

Example 3. Let $X = [0,1]$ and $0 < a < b < 1$. Let $G = \{\{x\} |\ x \notin [a,b]\} \cup \{[a,b]\}$. Show that G is upper semi-continuous and determine what familiar space X/G is homeomorphic to.

Example 4. Let $X = [0,1]$ and let J be a finite collection of disjoint subintervals of [0,1]. Let $G = \{\{x\} |\ x \notin \cup J\} \cup J$. Show that G is upper semi-continuous and determine what familiar space X/G is homeomorphic to.

Example 5. Let $X = [0,1]$ and let J be an infinite collection of disjoint subintervals of [0,1]. Let $G = \{\{x\} |\ x \notin \cup J\} \cup J$. Then is G upper semi-continuous? If yes determine what space X/G is homeomorphic to.

Example 1s - 5s. Repeat the above constructions but using the Sorganfrey topology. In each case determine if the collection G is upper semi-continuous.