
MARGO KONDRATIEVA, Memorial University
Case-invariant proofs in a dynamic geometry environment

When doing *proof by cases* on paper very often we need to come up with different ideas and techniques in each particular case of a more general situation, and draw each particular case separately. However, in a dynamic geometry environment (DGE) a smooth visual transition between different cases is often available. For example, one may easily pass from the case of obtuse triangle to the case of acute triangle by *dragging* a vertex of this triangle. In this presentation we are interested in constructions of geometrical solutions that are valid in all possible cases of a given problem and their case-invariance is observable by *dragging* base points of a dynamic drawing (applet). We discuss examples of problems from Euclidean geometry and their case-invariant solutions produced in a DGE.

In each of our examples the discussion of a case-invariant solution has a slightly different emphasis. In the first example we demonstrate the importance of consideration of special cases: the key contraction that was found in a special case of our problem suggested the solution to the original problem taken in full generality. In the second example we illustrate the possibility to notice some additional geometrical facts useful for proving other statements while looking at different cases of a theorem's proof. Another example shows that trying to unify various cases of a problem using a DGE may allow one to deepen their understanding of certain geometrical notions (such as area) and make connections with other branches of mathematical knowledge.