

Superposition

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Congruence and Similarity

Superposition

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- 1 Another take on Congruence
- 2 Similarity -the role of arithmetic and geometry

Congruence of triangles-Hilbert

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Basic notions: point, line, incidence, between, congruence
(angle,segment)
defined terms: segment angle
Axioms included SAS

Congruence of triangles-transformation approach

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A **transformation** of a geometry is a permutation of the points and a permutation of the lines that preserves incidence. If it also preserves congruence of segments and angles then it is a **rigid motion**

Now a key axiom is:

Superposition Axiom:

If angle $BAC = DEF$ there is an isometry taking A to E and such that $B'A'$ (i.e. BE) lies on DE and $C'A'$ lies on FE .

yields SAS

Exercises

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Exercise: Prove SAS from this axiom and Hilbert order and congruence up to but not including SAS.

Exercise: Prove that if $AB \cong CD$ there is rigid motion mapping A to C and B to D .

Congruence-Weinzweig

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Basic notions: point, line, incidence, between, **motion**
defined terms: segment angle, **congruence**

Definition. Two figures are congruent if they are mapped to each other by a motion.

Axioms guarantee that the group of motions are 'the right group':
SAS is a theorem.