Numerical moduli in the geometry of [special] multi-flags

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A number of key issues concerning distributions generating 1-flags (most often called Goursat flags) has been settled over the past 30 years.

Presently similar questions are being discussed as regards distributions generating *multi*-flags. (More precisely, only so-called *special* multi-flags, to avoid functional moduli in local classifications.) In particular, special 2-flags of small lengths are a natural ground for the search of generalizations of theorems established earlier for Goursat structures. This includes the search for the first appearing modulus (or moduli) in the classification up to local diffeomorphisms of special 2-flags. (For Goursat flags the first modulus of the local classification appears in length 8.)

It has been known in this respect that up to length 4 that classification is finite ([3], [2]), and that in length 7 at least one numerical modulus exists, as produced on pp. 39 – 41 in [3]. (That result from the year 2010 went unnoticed in [1].)

In the last fully classified length 4 possible are precisely 34 local geometries (local models) of special 2-flags.

We now demonstrate that in the length 5 single numerical moduli show up in exactly three out of altogether 41 singularity classes of special 2-flags existing in that length.

References

[1] A. L. Castro, S. J. Colley, G. Kennedy, S. Shanbrom; *A coarse stratification of the Monster Tower*, Michigan Math. J. **66** (2017), 855 – 866.

[2] A. Castro, W. Howard; *A Monster Tower approach to Goursat multi-flags*. Diff. Geom. Appl. **30** (2012), 405 – 427.

[3] P. Mormul, F. Pelletier; *Special 2-flags in lengths not exceeding four: a study in strong nilpotency of distributions*.
ArXiv 1011.1763 (November 2010).