

Supplement to Magnetic Generalized Residue Designs

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To complement the static magnetic field plots presented in this paper, we include a series of supplementary videos that show the magnetic field evolving in a plane parallel to the wire configuration at increasing distances z . These visualizations start at the wire plane itself ($z = 0$) and continue upward until the field decays and its structure stabilize. This progression offers insight into how the spatial patterns generated by each design propagate into three-dimensional space. A list of the videos, along with brief mathematical descriptions of each configuration, is provided below.

`5inU59.mp4`

Magnetic field evolution for the cyclic subgroup generated by 5 in U_{59} . The video shows the field in planes parallel to the wire, from $z = 0$ upwards.

`7inU73.mp4`

Magnetic field patterns for the cyclic subgroup of U_{73} generated by 7. The field is visualized in increasing parallel planes.

`Coset_7inU73_1_1_-1_1.mp4`

Magnetic field for the coset structure induced by multiplication by 7 in U_{73} , with signature sequence $(1, 1, -1, 1)$ applied to four cosets.

`Coset_7inU73_1_1_1_-1.mp4`

Coset-based wire configuration using generator 7 in U_{73} , with signature $(1, 1, 1, -1)$. Field shown across parallel planes.

`Coset_7inU73_Same.mp4`

Same-signature coset configuration of 7 in U_{73} ; all cosets oriented with identical current direction.

`Cosets_of_5inU59_Opposite.mp4`

Coset configuration of the subgroup generated by 5 in U_{59} , with alternating current directions between cosets (opposite orientation).

`Cosets_of_5inU59_Same.mp4`

Same setup as above, but all cosets in U_{59} oriented with the same current direction.

U97_genby5.mp4

Magnetic field generated by the full group U_{97} with generator 5, i.e., $\langle 5 \rangle = U_{97}$.

U97_genby7.mp4

Field visualization for the full group U_{97} generated by 7, another primitive root.

U97_genby10.mp4

Full field for U_{97} generated by 10. Although 10 is not a primitive root, it generates a large subgroup; field shown accordingly.