Contribution ID: **21** Type: **not specified**

The Hamilton-Waterloo problem with cycle sizes of different parity

The Hamilton-Waterloo problem asks for a decomposition of the complete graph into r copies of a 2-factor F_1 and s copies of a 2-factor F_2 such that $r+s=\left\lfloor \frac{v-1}{2} \right\rfloor$. If F_1 consists of m-cycles and F_2 consists of n cycles, then we call such a decomposition a $(m,n)-\mathrm{HWP}(v;r,s)$. The goal is to find a decomposition for every possible pair (r,s). This problem has been studied in great depth in the cases when m and n have the same parity, but there are few general results for the case of different parity.
In this work, we use rings of polynomials of the form $\mathbb{Z}_{2^n}[x]/\left\langle x^2+x+1\right\rangle$ to show that for odd x and y, there is a $(2^k x, y)-\mathrm{HWP}(vm;r,s)$ if $\gcd(x,y)\geq 3$, $m\geq 3$, and both x and y divide v, except possibly when $1\in\{r,s\}$.

Primary author: Prof. PASTINE, Adrian (Universidad Nacional de San Luis)

Co-author: KERANEN, Melissa (Michigan Technological University)

Presenter: Prof. PASTINE, Adrian (Universidad Nacional de San Luis)