Hsin-Yun Ching, Rigoberto Flórez, F. Luca, Antara Mukherjee, and
J. C. Saunders

Abstract In this paper, we look at numbers of the form $H_{r,k} := F_{k-1}F_{r-k+2} + F_k F_{r-k}$. These numbers are the entries of a triangular array called the *determinant Hosoya triangle* which we denote by $\mathcal{H}$. We discuss the divisibility properties of the above numbers and their primality. We give a small sieve of primes to illustrate the density of prime numbers in $\mathcal{H}$. Since the Fibonacci and Lucas numbers appear as entries in $\mathcal{H}$, our research is an extension of the classical questions concerning whether there are infinitely many Fibonacci or Lucas primes. We prove that $\mathcal{H}$ has arbitrarily large neighbourhoods of composite entries. Finally we present an abundance of data indicating a very high density of primes in $\mathcal{H}$.