

In 1999, I.M.Duursma first defined for a linear code its zeta function. It contains precisely the same information as the weight distribution of a linear code, also presents it in a form that resembles the classical zeta functions. In the analogy that appears between codes and curves, there is a correspondence between the MacWilliams identities for codes and the functional equation for curves. And the Hasse-Weil bound for curves can be interpreted for codes as an upper bound for the minimum distance. It is a natural open question whether the analogy extends to the Riemann hypothesis for curves, which was proved by André Weil in 1948 and which says that all zeros of the zeta function have the same absolute value. Such a “Riemann hypothesis analogue for linear codes (RH analogue)” implies tighter asymptotic upper bounds for self-dual codes. The RH analogue can be verified directly for known weight enumerators. We found many examples for which it held. We had a lot of numeric experiments of Type II codes by a computer. In the case of extremal, we checked by a computer that the RH analogue holds for codes of length up to 480. We show in detail for extremal Type II codes of length 16. Moreover we found some examples of not-extremal Type II codes which the RH analogue held.