1145-94-79 **Mohamad Moussa***, moussa7@math.arizona.edu, and **Marek Rychlik**, rychlik@email.arizona.edu. *Beyond RAID 6 — an Efficient Systematic Code Protecting Against Multiple Errors, Erasures, and Silent Data Corruption.*

RAID systems combine multiple storage devices to be accessed in parallel and thus give a greater throughput than a single device. RAID employs the techniques of mirroring, stripping, or parity to make the array of devices more reliable. RAID systems experience two types of errors which are known as erasures "Z" (errors whose locations are known by the system, such as failure of storage devices), and random errors "E" (errors whose locations are unknown and should be determined by the system). Random errors arise from a variety of factors such as software or hardware malfunction.

An error correcting code is capable of recovering from any combination of Z and E provided that $Z + 2E \leq d - 1$, where d is the minimum distance of the code. RAID 6 is able to recover from any combination provided that $Z + 2E \leq 2$. Hence, when in degraded (i.e., when $Z \geq 1$), RAID 6 loses its ability for detecting and correcting random errors (i.e., $E = 0$), leading to a data loss known as silent data corruption.

We developed a replacement for RAID 6, based on a new linear, systematic code, which detects and corrects any combination of E and Z provided that $Z + 2E \leq 4$. The computational complexity of our RAID is comparable to that of RAID 6. (Received July 24, 2018)