1116-68-2635 **Abbas Mahdi Alhakim*** (aa145@aub.edu.lb). *Properties of Generalized de Bruijn Digraphs.* Preliminary report.

Generalized binary de Bruijn digraphs are regular directed graphs with N nodes, labeled $0, 1, \ldots, N-1$, with edges from i to $2i$ and $2i+1 \mod N$. Traditional de Bruijn sequences, which have been used as pseudorandom sequences, correspond to Hamiltonian cycles when N is a pure power of 2. We discuss some interesting properties of these digraphs for general N, stressing the similarities with traditional de Bruijn digraphs. For instance, Hamiltonian cycles exist when N is even and they correspond bijectively to Eulerian circuits in digraphs of size $N/2$. Moreover, cycles of all orders exist, two disjoint cycles can be joined into one cycle via the cross-join operation, and we establish that a Hamiltonian cycle can be cross-joined repeatedly to make another arbitrary Hamiltonian cycle. We also show some interesting computational results. (Received September 22, 2015)