The Parity of Chordless Cycles in Graphs

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We report on the structure of graphs whose chordless cycles have all the same parity. Some motivation for this problem is as follows: The *bipartite representation* of a $\{0,1\}$-matrix A is the bipartite graph $B = (R, C; E)$ where R and C represent the row and column sets of A and where nodes $i \in R$ and $j \in C$ are adjacent if $a_{ij} = 1$. The *intersection graph* $G = (C; E)$ of A has as node set the set of columns of A; nodes i and j are adjacent if a_{ki} and a_{kj} are both 1 for some row index k. A $\{0,1\}$-matrix A is *balanced* if and all the chordless cycles of its bipartite representation B have length congruent to 0 mod 4. If A is perfect, then all the chordless cycles of odd length in its intersection graph G and the complement of G are triangles. So understanding these graphs helps in the study of balanced and perfect matrices.

References

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