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**On a Conjecture of Lovász Concerning Bricks I
The Characteristic of a Matching Covered Graph**

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Abstract In 1987, Lovász conjectured that every brick G different from K_4 , \overline{C}_6 , and the Petersen graph has an edge e such that $G - e$ is a matching covered graph with exactly one brick. Lovász and Vempala announced a proof of this conjecture in 1994. Their paper is under preparation. In this paper and its sequel ([4]) we present a proof of this conjecture. We shall in fact prove that if G is a brick different from K_4 , \overline{C}_6 , R_8 (see Figure 1) that does not have the Petersen graph as its underlying simple graph, then it has two edges e and f such that both $G - e$ and $G - f$ are matching covered graphs with exactly one brick, with the additional property that, in each case, the underlying simple graph of that one brick is different from the Petersen graph.

A cut C of a matching covered graph G is a separating cut if the two C -contractions of G are matching covered. In this paper, we introduce the notion of the characteristic of a separating cut in a matching covered graph and establish some basic properties. We use those properties to first prove our Theorem for solid bricks, that is, bricks which do not have any nontrivial separating cuts. The proof of the Theorem for nonsolid bricks will be presented in [4].