Edge join of cubic graphs

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We introduce an edge join operation on cubic graphs, which deletes one selected edge of two cubic graphs and adds four edges to join the resulting vertices to get a new cubic graph. We show that this operation preserves a lot of nice properties of cubic graphs, including the following: (1) each path of length 3 can be extended to a Hamiltonian cycle, (2) the graph remains Hamiltonian if any two adjacent vertices are deleted, (3) the deletion of any 4-cycle leaves a Hamiltonian graph.

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