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GRAPH MANIFOLDS, ENDS OF NEGATIVELY CURVED SPACES AND THE HYPERBOLIC 120-CELL SPACE

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In this paper we show that a rich class of graph manifolds occur as ends of complete Riemannian manifolds with finite volume whose curvature is strictly negative and uniformly bounded from below.

For the purpose of this paper, a graph manifold W is given in the following way (for a more general notion see [16]): Let W_i be a finite collection of building blocks diffeomorphic to $\Sigma_i \times S^1$, where Σ_i is a closed oriented surface with some disjoint open balls removed, and S^1 is the unit circle. The boundary components of W_i are tori $S^1 \times S^1$, where the orientation on the first S^1-factor is induced from the boundary of Σ_i, and the second factor carries the canonical orientation of the S^1-factor of W_i. We obtain W from the W_i by gluing the tori in pairs, interchanging the factors, and preserving all orientations.

Then W can be described by a graph where the vertices correspond to the building blocks W_i, and the number at each vertex indicates the genus of Σ_i. If two building blocks are glued together on a boundary torus, we join the vertices by an edge. Examples are described by the graphs shown in Figure 1.

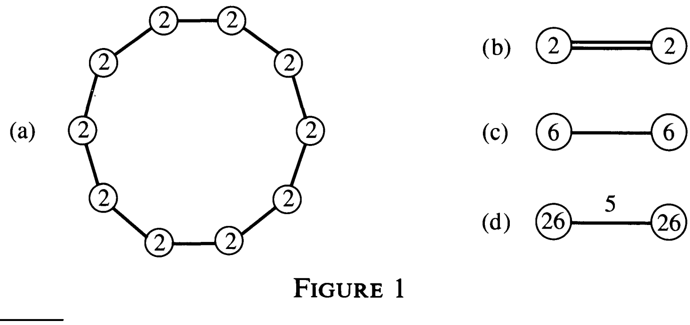

FIGURE 1

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