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Embedding Grids in Surfaces

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Abstract We show that if a very large grid is embedded in a surface, then a large subgrid is embedded in a disc in the surface. This readily implies that: (a) a minor-minimal graph that does not embed in a given surface has no very large grid; and (b) a minor-minimal k -representative embedding in the surface has no very large grid. Similar arguments show (c) that if G is minimal with respect to crossing number, then G has no very large grid. This work is a refinement of C. Thomassen, *A simpler proof of the excluded minor theorem for higher surfaces*, J. Combin. Theory, Ser. B **70** (1996) 306-311.