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On surfaces of general type with $q = 5$

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Abstract. We prove that a complex surface S with irregularity $q(S) = 5$ that has no irrational pencil of genus > 1 has geometric genus $p_g(S) \geq 8$. As a consequence, we are able to classify minimal surfaces S of general type with $q(S) = 5$ and $p_g(S) < 8$. This result is a negative answer, for $q = 5$, to the question asked in [13] of the existence of surfaces of general type with irregularity q that have no irrational pencil of genus > 1 and with the lowest possible geometric genus $p_g = 2q - 3$ (examples are known to exist only for $q = 3, 4$).

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