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Complete subvarieties of moduli spaces of algebraic curves

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4.3 Characteristic 0

In characteristic 0 there is one point at which our construction may fail: the line bundle L associated to the divisor $(\pi_1^* + \pi_2^*)(K_{C/B}) + 2\Delta$ may not be eventually free. However, in the case B is a point, Keel proves that in all characteristics the line bundle L is eventually free [31][Theorem 3.0]. One can try to mimic his proof for the case in which B is a curve. The hard part is to show that for every $k > 0$ the restriction of L to the k -th order neighborhood of Δ inside $C \times_B C$ is trivial. However, we are unable to prove this.