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**Anthony P. van Groningen\*** (vangroningen@msoe.edu), Mathematics Department, 1025 N Broadway Ave, Milwaukee, WI 53202, and **Jeb F. Willenbring**. *The cubic, the quartic, and the exceptional group  $G_2$ .*

In 1949, J. A. Todd obtained a complete system of generators for the covariants of the double binary forms of degree  $(3, 1)$ . We reconsider Todd's results by relating it to split  $G_2$ . This analysis involves considering the branching rule from the rank two complex symplectic Lie algebra to a principally embedded  $\mathfrak{sl}_2$ . Special cases of this branching rule are related to the covariants for the cubic and quartic binary forms. (Received July 29, 2014)