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From Christoffel words to Markoff numbers

For a pair (a, b) of relatively prime natural numbers, the Christoffel word C(a, b) is defined by the path with integral vertices which is closest to the line segment from (0,0) to (a,b). Viewing this line segment as an arc in the once-punctured torus, we define a *J*-module M(a,b) for each Christoffel word. Here *J* is the Jacobian algebra of the once-punctured torus. We show that one obtains the Markoff number associated with C(a,b) by counting submodules of M(a,b).