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Towards the classification of Legendre multiplier sequences. Preliminary report.

Let $\{\gamma_k\}_{k=0}^{\infty}$ be a sequence of real numbers, and let $T : \mathbb{R}[x] \rightarrow \mathbb{R}[x]$ be defined by $T[P_n(x)] = \gamma_n P_n(x)$ ($n = 0, 1, 2, \dots$), where $P_n(x)$ is the n th Legendre polynomial. If T is a hyperbolicity preserver, we call the associated sequence a Legendre multiplier sequence. In this talk we present a proof of a recent conjecture, which states that if $p \in \mathbb{R}[x]$ is a polynomial and $\{p(k)\}_{k=0}^{\infty}$ is a Legendre multiplier sequence, then $\deg p = 2m$ for some $m \in \mathbb{N}$. In addition, we show that p must be a polynomial in $x^2 + x$, and discuss further properties p must possess. (Received September 06, 2016)