1047-14-246 **Carla Fidalgo*** (cfidalgo@isec.pt), Rua Pedro Nunes, Quinta da Nora, 3030-199 Coimbra, Portugal, Coimbra, Portugal, and **Alexander Kovacec** (kovacec@mat.uc.pt), P-3001-454 Coimbra, Coimbra, Portugal. *Diagonal minus tail forms and Lasserre's sufficient conditions for sums of squares.*

By a *diagonal minus tail* form (of even degree) we understand a real homogeneous polynomial $F(x_1, ..., x_n) = F(\underline{x}) = D(\underline{x}) - T(\underline{x})$, where the *diagonal* part $D(\underline{x})$ is a sum of terms of the form $b_i x_i^{2d}$ with all $b_i \geq 0$ and the *tail* $T(\underline{x})$ a sum of terms $a_{i_1 i_2 \ldots i_n} x_1^{i_1} \ldots x_n^{i_n}$ with $a_{i_1 i_2 \ldots i_n} > 0$ and at least two $i_\nu \geq 1$. We show that an arbitrary change of the signs of the tail terms of a positive semidefinite diagonal minus tail form will result in a sum of squares (sos) of polynomials. The work uses Reznick's theory of agiforms [Re] and gives easily tested sufficient conditions for a form to be sos; one of these is piecewise linear in the coefficients of a polynomial and reminiscent of Lassere's recent conditions [La] but proved in completely a different manner.

[La] J. B. Lasserre, Sufficient conditions for a polynomial to be a sum of squares, Arch. Math. 89, 390-398 (2007).

[Re] B. Reznick, Forms derived from the arithmetic geometric inequality, Math. Ann. 283, 431-464, (1989). (Received January 29, 2009)