Raymond E. Molzon* (remolzon@mtu.edu), 1400 Townsend Dr., Mathematical Sciences, Houghton, MI 49931. The minimum measure of concordance in a multivariate version of Spearman’s rank correlation. Preliminary report.

Spearman’s rank correlation is an asymptotically unbiased estimator of the grade correlation $\rho_S$ between two random variables $X$ and $Y$, and $\rho_S$ is an instance of a bivariate measure of concordance. It is known that $\rho_S$ attains its minimum value of $-1$ when $Y$ is almost surely a strictly decreasing function of $X$. In a multivariate setting, where $\rho_S$ is a measure of concordance between $k$ random variables $X_1, \ldots, X_k$, we use geometric reasoning about the grade correlation to show that the minimal value of $\rho_S$ is $-\frac{1}{k-1}$ and consider an example distribution where this minimal value is attained. (Received September 22, 2009)