SymPy Calculations

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Summary

This document records computations that I think would be easier to make in SymPy than on paper. For now it does the following:

1. Compute the optimal values of θ, η_1 and η_2 for the simple nonmonotone GLS estimator (Notes: Pages 237-243+).

$$-Y^1-(X_1^1-\eta_1)\left(\frac{C(X_1^1X_2^1)C(X_2^1Y^1)}{-\left(C(X_1^1X_2^1)\right)^2+V(X_1^1)V(X_2^1)}+\frac{C(X_1^1Y^1)V(X_2^1)}{\left(C(X_1^1X_2^1)\right)^2-V(X_1^1)V(X_2^1)}\right)+\left(X_2^1-\frac{\frac{C(X_1^2X_2^2)(X_1^2-\eta_1)}{V(X_1^2)}-X_2^2+\frac{C(X_1^1X_2^1)(X_1^1-\eta_1)}{V(X_1^1)}-X_2^1}{\frac{\left(C(X_1^2X_2^2)\right)^2}{V(X_1^2)}-V(X_2^2)+\frac{\left(C(X_1^1X_2^1)\right)^2}{V(X_1^1)}-V(X_2^1)}\right)\left(\frac{C(X_1^1X_2^1)C(X_1^1Y^1)}{\left(C(X_1^1X_2^1)\right)^2-V(X_1^1)V(X_2^1)}-\frac{C(X_2^1Y^1)V(X_1^1)}{\left(C(X_1^1X_2^1)\right)^2-V(X_1^1)V(X_2^1)}\right)}{-C(X_1^1Y^1)\left(\frac{C(X_1^1X_2^1)C(X_2^1Y^1)}{-\left(C(X_1^1X_2^1)\right)^2+V(X_1^1)V(X_2^1)}+\frac{C(X_1^1Y^1)V(X_2^1)}{\left(C(X_1^1X_2^1)\right)^2-V(X_1^1)V(X_2^1)}\right)+C(X_2^1Y^1)\left(\frac{C(X_1^1X_2^1)C(X_1^1Y^1)}{\left(C(X_1^1X_2^1)\right)^2-V(X_1^1)V(X_2^1)}-\frac{C(X_2^1Y^1)V(X_1^1)}{\left(C(X_1^1X_2^1)\right)^2-V(X_1^1)V(X_2^1)}\right)-V(Y^1)}+\frac{\frac{C(X_1^3Y^2)(X_1^3-\eta_1)}{V(X_1^3)}-Y^2}{\frac{\left(C(X_1^3Y^2)\right)^2}{V(X_1^3)}-V(Y^2)}$$

$$-\frac{1}{C(X_1^1Y^1)\left(-\frac{C(X_1^1X_2^1)C(X_2^1Y^1)}{-\left(C(X_1^1X_2^1)\right)^2+V(X_1^1)V(X_2^1)}-\frac{C(X_1^1Y^1)V(X_2^1)}{\left(C(X_1^1X_2^1)\right)^2-V(X_1^1)V(X_2^1)}\right)+C(X_2^1Y^1)\left(\frac{C(X_1^1X_2^1)C(X_1^1Y^1)}{\left(C(X_1^1X_2^1)\right)^2-V(X_1^1)V(X_2^1)}+\frac{C(X_2^1Y^1)V(X_1^1)}{-\left(C(X_1^1X_2^1)\right)^2+V(X_1^1)V(X_2^1)}\right)-V(Y^1)}+\frac{1}{\frac{\left(C(X_1^3Y^2)\right)^2}{V(X_1^3)}-V(Y^2)}$$