Scheduling methods for the statistical setup adjustment problem (IJPR, 41(7), pp. 1467-1481): a correction and clarification

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In the first equation on page 1471 of our recent paper (Pan and Del Castillo, 2003) the right hand side should say $(d - \widehat{d}_0)/\sigma_\varepsilon$ and not $d - \widehat{d}_0$. In addition, we point out that the cost function (4) is *not* the same as that used by Trietsch (2000). As explained in the paper, equation (4) is obtained by assuming the setup error or offset d is an unknown, non-random constant. Trietsch (2000) assumes d to be a random variable with known mean and variance. If d is a constant, our derivation gives $\mathrm{Var}(Y_t)/\sigma_\varepsilon^2 \ \left(= 1 + \frac{t-1}{(\sigma_\varepsilon^2/P_0+t-1)^2}\right)$ since X_i is known at time $t(> i)$. Trietsch (2000), in contrast, assumed d random and arrives at $\frac{\sigma_\varepsilon^2/P_0+t}{\sigma_\varepsilon^2/P_0+t-1}$ which is really $\mathrm{Var}(Y_t|Y_{t-1}, Y_{t-2}, ..., Y_1)$. Our expression for $\mathrm{Var}(Y_t)$ can be much smaller than $\mathrm{Var}(Y_t|Y_{t-1}, ..., Y_1)$ when σ_ε^2/P_0 is small, particularly for the crucial first adjustment. This makes sense because in Trietsch (2000) P_0 is $\mathrm{Var}(d)$ (the setup variance) whereas in our paper P_0 is an a priori measure of confidence in the initial guess $\widehat{d}_0$ (thus, under constant d, $\mathrm{Var}(Y_1)$ always equals σ_ε^2 since the setup error is not random and all variability comes from the part to part error ε_1).

The comparisons in section 4 of our paper assume that d is an unknown constant. It is noteworthy that Trietsch's method performs quite well despite the different assumption made on d. We believe it is more appropriate to model d as a constant when interest is on a single lot of product, thus there is only one instance for observing the effects of the error. A random d is probably more appropriate when the same part is produced over several consecutive lots, with a setup before each lot. Finally, we point out that Trietsch (2000) also discussed an optimal network model approach to the setup adjustment scheduling problem (under d random), not considered in our paper, although the differences between such method and his approximate method considered in our paper should be minimal. The analogy with an inventory control problem, which is exploited in our paper, is ours.

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References

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