mity coefficient should be done by conducting field experiments in future.

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Discussion of "Method of Solution of Nonuniform Flow with the Presence of Rectangular Side Weir" by Maurizio Venutelli

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The discussers would like to thank the author for presenting an iterative step method for solving the spatially varied flow equation with decreasing discharge. The discussers, however, would like to add a few points.

The proposed iterative step method incorporates the variations along the side weir, of the specific energy due to the bottom and friction slope, of the weir coefficient, and of the velocity distribution coefficient. The results, in comparison with experimental data and with the solutions obtained assuming constant specific energy, are also presented.

To improve the solution, the author incorporates the variations along the side weir for different parameters, but for achieving a direct integration of the spatially varied flow equation, these parameters have been assumed constant for the computational weir segments (Δx). In this case, the accuracy of the proposed analytical solution is influenced. Considering constant energy along the computational weir segment causes $c_1=0$. Thus, this parameter can be omitted in the proposed analytical solution. In such a case, the solution reduced to the solution proposed by De Marchi (1934). Also since $\Delta x \neq 0$ the application of Eq. (22) or Eq. (23) in the original paper requires a tedious trial and error procedure.

Suitable Governing Equation

For a short weir, the hypothesis of constant specific energy along the side weir is acceptable ($S_f=S_0$). Considering this assumption and assuming $\alpha=1$, the nonlinear ordinary differential equation governing spatially varied flow with decreasing discharge takes the form

$$\frac{dy}{dx}=\frac{\frac{4C_W}{3W}\sqrt{E-y}\sqrt{(y-p)^3}}{3y-2E} \tag{1}$$

Muslu (2001) derived the weir coefficient for subcritical flow conditions in the case of $\Delta x=0$

$$C_W=0.611\sqrt{3[1-0.036\sqrt{2(E/y-1)}](y/E)-2} \tag{2}$$

An analytical solution of Eq. (1) is not possible for variable weir coefficient. In this case, Eq. (1) can be numerically integrated with the aid of any mathematical software such as MathCad, Maple, or Mathematica.

To verify Eq. (1), it is referred to the experimental observations carried out by Hager (1982) and mentioned by the author. In current research, specific energy at the control section is considered a constant for numerical integration of Eq. (1). The computed and measured values are given in Table 1 together with computed values by Muslu (2001). In comparison with the author's solution, the numerical integration method gives better results as indicated by the standard error values. Discharges and flow depths calculated in the current study are also shown in Fig. 1. As seen, the predicted values are in good agreement with the measured ones.

Alternative Governing Equation

Considering $\alpha=1$, subcritical depth in a rectangular canal can be determined by the inversion of the specific energy equation as (Chanson 1999)