

does not involve x , that aa' is a coefficient of the first power of x , and that both multipliers of the divisor, or upper line, while a^2 is a multiplier of the dividend, or lower line, and does not involve x . Remembering this enables us to see at what terms we must start to multiply the upper line ($a' - b' - c' - d' - \dots$) by A and B respectively in order to obtain in each case a term involving x^{n-2} , the first power of x retained; and also at what term we are to start to multiply the lower line by O in order to obtain a term involving x^{n-2} .

If the multipliers have a common measure it may be struck out, and the multipliers, thus reduced, used instead.

If at any stage the terms of the remainder have a common factor it may be struck out, and the remainder, thus reduced, used instead. Changes of sign must not be made.

We append a numerical example:

Required all the Sturmian functions of $x^4 - 3x^3 - 2x^2 + x - 3 = 0$.

Here, the first dividend is $x^4 - 3x^3 - 2x^2 + x - 3$, and the first divisor, i.e. the first derived function, $4x^3 - 9x^2 - 4x + 1$. Young's method will be as follows:

$$\begin{array}{r}
 4+9+4-1 \\
 \times \\
 1-3-2+1-3 \\
 \hline
 -3 \quad -27-12+3 \\
 4 \quad 16-4 \\
 16 \quad -32+16-48 \\
 \hline
 -43+0-45=1\text{st rem.} \\
 43-0+45=1\text{st rem. with sign changed.} \\
 \hline
 43+0-45 \\
 \times \\
 4-9-4+1 \\
 \hline
 -9 \times 48 \quad -9 \quad 0+405 \\
 4 \times 48 \quad 4 \quad -180 \\
 (43)^2 \quad 48 \quad -172+48 \\
 \hline
 -352+448=2\text{nd rem.} \\
 352-448=2\text{nd rem. with sign changed} \\
 \hline
 11-14 \div \text{ing by } 32. \\
 \hline
 11+14 \\
 43-0+45 \\
 \hline
 602 \quad 8428 \\
 473 \quad 0 \\
 121 \quad 5445 \\
 \hline
 13873=3\text{rd rem.} \\
 -13873=3\text{rd rem. with sign changed.}
 \end{array}$$

The Sturmian functions accordingly are:

$$\begin{array}{l}
 x^4 - 3x^3 - 2x^2 + x - 3 \\
 4x^3 - 9x^2 - 4x + 1 \\
 43x^2 + 45 \\
 11x - 14 \\
 -13873.
 \end{array}$$

So far as finding the positions of the roots is concerned, we might have stopped at the first remainder, $43x^2 + 45$, since this cannot change sign, and Sturm shows that when we arrive at a remainder which cannot change sign the remaining steps are unnecessary. Again, the last step was quite superfluous, since we required merely the sign of the remainder on dividing $43x^2 + 45$ by $11x - 14$, and substituting $\frac{14}{11}$ for x in $43x^2 + 45$, we see the remainder must be positive, and therefore that the last Sturmian function must be negative.

The correspondence received during the past month will be attended to in our next issue.

Practical Education.

Queries in relation to methods of teaching, discipline, school management, &c., will be answered in this department. J. HUGHES, Toronto.

CONVERSATIONAL COLUMN.

1. Please define "tattling," and show the difference between "tale-bearing" and the giving of proper information to a teacher. A pupil is a "tale-bearer" when he informs his teacher on a fellow pupil in order to gratify a revengeful or spiteful desire to have him punished. He is not a "tale-bearer" when he gives information to his teacher, either voluntarily or at the teacher's request, concerning destruction of school property, immorality, or any course of conduct calculated to lower the moral tone of the pupils generally, or subvert the proper authority of the teacher. A judicious teacher will be very careful not to encourage an undue amount of informing on a fellow pupil. No pupil should ever voluntarily inform on another without first giving him an opportunity to state the matter himself to his teacher. The teacher should never ask any pupil for specific information in reference to any wrongdoing without first giving the culprit a chance to acknowledge his error, or guilt.

2. Which is the most effective style for the teacher to adopt, a high or a low tone of voice?

A low tone, by all means. It is much more impressive in teaching, and infinitely more effective in securing good discipline. Children soon cease to attend to a teacher with a loud voice pitched on a high key. It is not surprising that they do so. Teachers should speak in a natural tone, and quietly. It wears themselves less, and benefits their pupils more than a high tone does. Many a teacher has a restless, uneasy class because his voice has too much resemblance to the sound of saw-filing. A teacher who speaks in a forced, high key, makes his mark upon his pupils, and turns out a class of loud talking ranters, whose speaking in private and public life is shorn of all its beauty and half its power.

MAP DRAWING.

III.

OUTLINING.

This should first be done in pencil. The coast line should be drawn first; rivers, mountains, cities, &c., can be sketched afterwards. The map of the Maritime Provinces of the Dominion may be used by way of an illustration.

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