DIAGXY AND XY MATRIX

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We illustrate some of the advantages of diagxy over the matrix version of xy-pic. I should emphasize the fact that these defects are not in the underlying xy-pic (else they could not be repaired in diagxy, which is, after all, only a front end to xy-pic) but are actually defects of the matrix mode. If you compose the file:

```
\documentclass{tac}
\usepackage[matrix]{xy}
\input diagxy
\mathrmdef{Hom}

\begin{document}

  $$\bfig
  \morphism[A^{B^C}`X_{Y_Z};]
  \efig$$

$$
  \xymatrix{A^{B^C}\ar[r]& X_{Y_Z}}
$$

  $$\bfig
  \Atriangle[C`D`\Hom(A^{B^C},X_{Y_Z});``]
  \efig$$

$$
  \xymatrix{&C\ar[dl]\ar[dr]\\D\ar[rr]&&\Hom(A^{B^C},X_{Y_Z})}
$$

  $$\bfig
  \morphism<900,0>[\Hom(A,B)`\Hom(A',B);\Hom(f,B)]
  \efig$$

$$
  \xymatrix{\Hom(A,B)\ar[r]^{\Hom(f,B)}&\Hom(A',B)}
$$

$$
  \xymatrix{\Hom(A,B)\ar[rr]^{\Hom(f,B)}&&\Hom(A',B)}
```

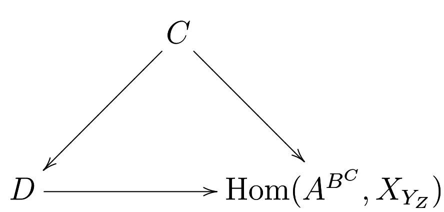
~~~
$$

  $$\bfig
\square/>``>`>/<525,500>[\cdots`H^n(Y,(A^G)_V)`\cdots`{H^n(X;G,A_U)};``\cong`]
\square(525,0)/>``>`>/<750,500>[H^n(Y,(A^G)_V)`H^n(Y,A^G)
`{H^n(X;G,A_U)} `{H^n(X;G,A)};```]
  \square(1275,0)/>``>`>/<750,500>[H^n(Y,A^G)`H^n(Y,(A^G)_{Y_0})
  `{H^n(X;G,A)}`{H^n(X;G,A_{X_0})};```]
  \square(2025,0)/>``>`>/<850,500>[H^n(Y,(A^G)_{Y_0})`H^{n+1}(Y,(A^G)_V)
  `{H^n(X;G,A_{X_0})}`{H^{n+1}(X;G,A_U)};``\cong`]
  \square(2875,0)/>```>/<575,500>[H^{n+1}(Y,(A^G)_V)`\cdots
  `{H^{n+1}(X;G,A_U)}`\cdots;```]
  \efig$$


  \end{document}
~~~

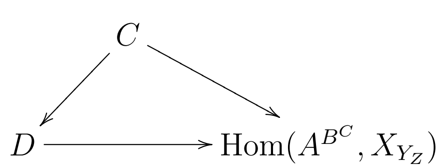
you will get a sequence of diagrams some in diagxy and some in xy-pic. The first pair illustrates the fact that the arrows in diagxy come out vertically centred on the whole node, not on its core element, so that having a complex superscript on one and subscript on the other leaves the central elements at different heights. Compare the two:

$$A^{B^C} \longrightarrow X_{Y_Z}$$

$$A^{B^C} \longrightarrow X_{Y_Z}$$

The next pair are pretty much self-explanatory. It comes as the result of the fact that the nodes are quite different sizes:





Xymatrix does not give fine control over horizontal spacing. You have to choose, in xy-pic, between making the second element one or two columns over from the first. In diagxy, you can adjust it as necessary.

$$\mathrm{Hom}(A,B) \xrightarrow{\mathrm{Hom}(f,B)} \mathrm{Hom}(A',B)$$

$$\mathrm{Hom}(A,B)\xrightarrow{\mathrm{Hom}(f,B)}\mathrm{Hom}(A',B)$$

$$\mathrm{Hom}(A,B)\xrightarrow{\quad\mathrm{Hom}(f,B)\quad}\mathrm{Hom}(A',B)$$

This simple example is not convincing, but this is followed by a diagram (taken from an actual paper) in which the ability to control horizontal spacing in small units is crucial to getting the diagram on a single line. Widths of the several nodes are 525, 750, 750, 850, and 575 units, respectively:

$$\begin{array}{ccccccccccc}
\cdots & \to & H^n(Y,(A^G)_V) & \longrightarrow & H^n(Y,A^G) & \longrightarrow & H^n(Y,(A^G)_{Y_0}) & \longrightarrow & H^{n+1}(Y,(A^G)_V) & \to & \cdots \\
 & & \Big\downarrow{\scriptstyle\cong} & & \Big\downarrow & & \Big\downarrow & & \Big\downarrow{\scriptstyle\cong} & & \\
\cdots & \to & H^n(X;G,A_U) & \to & H^n(X;G,A) & \to & H^n(X;G,A_{X_0}) & \longrightarrow & H^{n+1}(X;G,A_U) & \to & \cdots
\end{array}$$

If you prefer to code diagrams by placing nodes and then arrows between them (more like xy-pic), this is also possible as illustrated by the following code that sets exactly the same diagram as the preceding.

```
$$\bfig
\node 1a(0,500)[\cdots]
\node 1b(525,500)[H^n(Y,(A^G)_V)]
\node 1c(1275,500)[H^n(Y,A^G)]
\node 1d(2025,500)[H^n(Y,(A^G)_{Y_0})]
\node 1e(2875,500)[H^{n+1}(Y,(A^G)_V)]
\node 1f(3450,500)[\cdots]
\node 2a(0,0)[\cdots]
\node 2b(525,0)[H^n(X;G,A_U)]
\node 2c(1275,0)[H^n(X;G,A)]
\node 2d(2025,0)[H^n(X;G,A_{X_0})]
\node 2e(2875,0)[H^{n+1}(X;G,A_U)]
\node 2f(3450,0)[\cdots]
\arrow[1a‘1b;]
\arrow[1b‘1c;]
\arrow[1c‘1d;]
\arrow[1d‘1e;]
\arrow[1e‘1f;]
\arrow[2a‘2b;]
\arrow[2b‘2c;]
\arrow[2c‘2d;]
\arrow[2d‘2e;]
\arrow[2e‘2f;]
\arrow|r|[1b‘2b;\cong]
\arrow[1c‘2c;]
```

```
\arrow[1d`2d;]
\arrow|r|[1e`2e;\cong]
\efig$$
```

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