Dednat6: some comparisons with diagxy

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A few weeks after my article about Dednat6 appeared in TUGBoat Michael Barr sent me an e-mail asking how I would do in Dednat6 two diagrams from the diagxy manual (sec.1) and two other diagrams (sec.2)...

1 "A few samples"

The section "A few samples" in the diagxy manual — section 4.9 or 5.9, depending on the version — has big two diagrams, one based on a 5×8 grid and one based on a triangle.

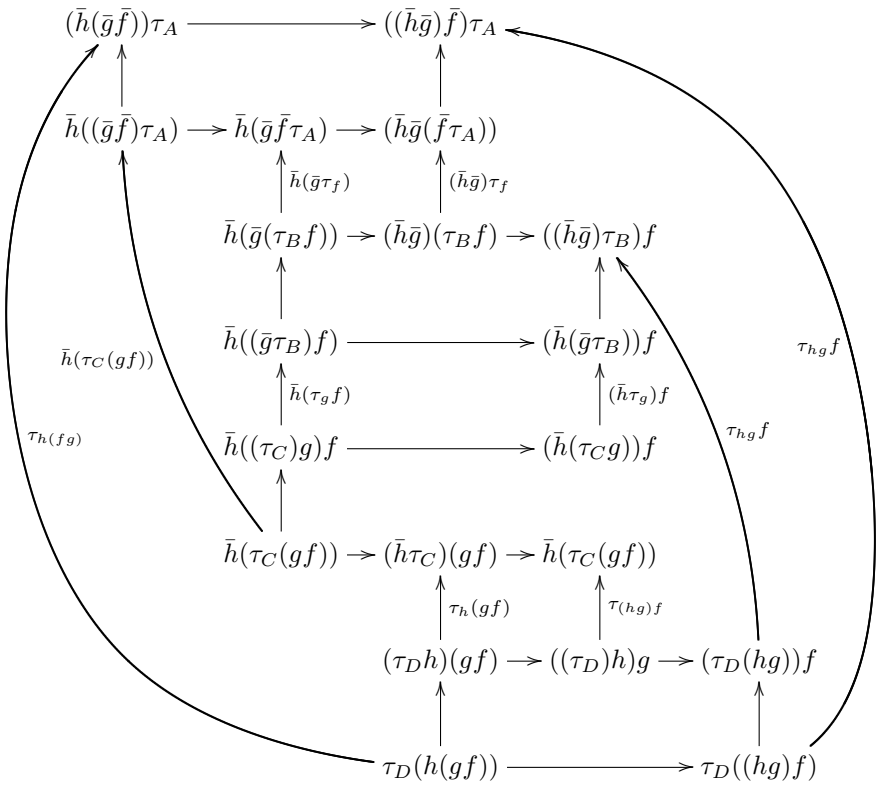
1.1 The 5×8 diagram

Barr's 5×8 diagram uses splines for the outermost curved arrows, and he hardcodes their controls points: look for the '`c,(3000,0),(2700,2800),p`' and the '`c,(-300,0),(-600,2400),p`' in the last two '`\arrow`'s. In dednat6 the "low-level coordinates" of nodes are not trivial to get; I just hacked a way to insert these '`c,(_,_),(_,_),p`'s into '`\morphism`'s and guessed values that gave a result that looked reasonably well.

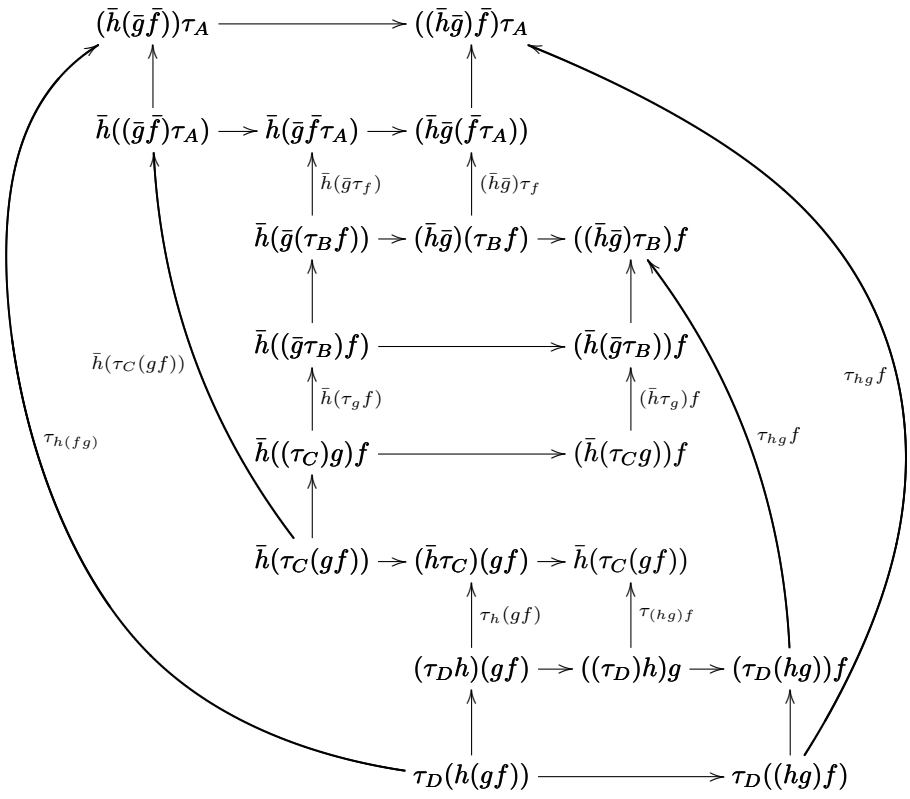
```
% Source code for Barr's diagram:
%
$$\bfig
  \def\f{\bar f}
  \def\g{\bar g}
  \def\h{\bar h}
  \let\t\tau
  \node A11(0,2800)[(\h(\g\f))\t_A]
  \node A13(1200,2800)[((\h\g)\f)\t_A]
  \node A21(0,2400)[\h((\g\f)\t_A)]
  \node A22(600,2400)[\h(\g\f\t_A)]
  \node A23(1200,2400)[(\h\g(\f\t_A))]
  \node A32(600,2000)[\h(\g(\t_Bf))]
  \node A33(1200,2000)[(\h\g)(\t_Bf)]
  \node A34(1800,2000)[((\h\g)\t_B)f]
  \node A42(600,1600)[\h((\g\t_B)f)]
  \node A44(1800,1600)[(\h(\g\t_B))f]
  \node A52(600,1200)[\h((\t_C)g)f]
  \node A54(1800,1200)[(\h(\t_Cg))f]
  \node A62(600,800)[\h(\t_C(gf))]
  \node A63(1200,800)[(\h\t_C)(gf)]
  \node A64(1800,800)[\h(\t_C(gf))]
  \node A73(1200,400)[(\t_Dh)(gf)]
  \node A74(1800,400)[((\t_D)h)g]
  \node A75(2400,400)[(\t_D(hg))f]
  \node A83(1200,0)[\t_D(h(gf))]
  \node A85(2400,0)[\t_D((hg)f)]
  \arrow[A11`A13;]
  \arrow[A21`A11;]
  \arrow[A21`A22;]
  \arrow[A22`A23;]
  \arrow[A23`A13;]
  \arrow[A32`A22;\h(\g\t_f)]
  \arrow[A32`A33;]
  \arrow[A33`A23;(\h\g)\t_f]
  \arrow[A33`A34;]
  \arrow[A42`A44;]
  \arrow[A42`A32;]
  \arrow[A44`A34;]
  \arrow[A52`A42;\h(\t_gf)]
  \arrow[A52`A54;]
  \arrow[A54`A44;(\h\t_g)f]
  \arrow[A62`A52;]
  \arrow[A62`A63;]
  \arrow[A63`A64;]
  \arrow[A73`A63;\t_h(gf)]
  \arrow[A73`A74;]
  \arrow[A74`A64;\t_{hg}f}]
  \arrow[A74`A75;]
  \arrow[A83`A73;]
  \arrow[A83`A85;]
  \arrow[A85`A75;]
  \arrow|r|/{@{>}@/_15pt/}/[A75`A34;\t_{hg}f]
  \arrow|l|/{@{>}@/^15pt/}/[A62`A21;\h(\t_C(gf))]
  \arrow|l|/{@{>}@^{c,(3000,0),(2700,2800),p}}/[A85`A13;\t_{hg}f]
  \arrow|r|/{@{>}@^{c,(-300,0),(-600,2400),p}}/[A83`A11;\t_{h(fg)}]
  \efig
$$
```

```
% Source code for its translation to Dedmat6:
%
%D diagram barr-dedmat6
%D 20x      100    +40    +40    +40    +40
%D 20  100 A11 --------> A13
%D 20       ~              ~
%D 20       |              |
%D 20  +27 A21 -> A22 -> A23
%D 20       ~      ~       ~
%D 20       |      |       |
%D 20  +27  |      A32 -> A33 -> A34
%D 20       |      ~              ~  ~
%D 20       |      |                 |    \
%D 20  +27  |      A42 --------> A44   \
%D 20       |      ~              ~     \
%D 20        \     |                    |
%D 20  +27    \    A52 --------> A54     |
%D 20          \   ~                     |
%D 20           \  |                     |
%D 20  +27         A62 -> A63 -> A64     |
%D 20              |      ~      ~       |
%D 20              |      |      |       |
%D 20  +27         |      A73 -> A74 -> A75
%D 20              |      ~              ~
%D 20              |                     |
%D 20  +27         |      A83 --------> A85
%D 20
%D ren A11    A13   ==>   (\h(\g\f))\t_A          ((\h\g)\f)\t_A
%D ren A21 A22 A23   ==>   \h((\g\f)\t_A) \h(\g\f\t_A) (\h\g\f\t_A))
%D ren     A32 A33 A34     ==>           \h(\g(\t_Bf)) (\h\g)(\t_Bf) ((\h\g)\t_B)f
%D ren     A42     A44     ==>           \h((\g\t_B)f)               (\h(\g\t_B))f
%D ren     A52     A54     ==>           \h((\t_C)g)f                (\h(\t_Cg))f
%D ren     A62 A63 A64     ==>           \h(\t_C(gf)) (\h\t_C)(gf) \h(\t_C(gf))
%D ren         A73 A74 A75 ==>                        (\t_Dh)(gf) ((\t_D)h)g (\t_D(hg))f
%D ren         A83     A85 ==>                        \t_D(h(gf))            \t_D((hg)f)
%D
%D (( # Horizontal arrows:
%D    A11 A13 ->
%D    A21 A22 -> A22 A23 ->
%D    A32 A33 -> A33 A34 ->
%D    A42 A44 ->
%D    A52 A54 ->
%D    A62 A63 -> A63 A64 ->
%D    A73 A74 -> A74 A75 ->
%D    A83 A85 ->
%D
%D    # Simple vertical arrows:
%D    A11 A21 <-                    A13 A23 <-
%D    A22 A32 <- .plabel= r \h(\g\t_f) A23 A33 <- .plabel= r (\h\g)\t_f
%D    A32 A42 <-                    A34 A44 <-
%D    A42 A52 <- .plabel= r \h(\t_gf)  A44 A54 <- .plabel= r (\h\t_g)f
%D    A52 A62 <-
%D    A63 A73 <- .plabel= r \t_h(gf)   A64 A74 <- .plabel= r \t_{hg}f}
%D    A73 A83 <- A75 A85 <-
%D
%D    # Curved vertical arrows:
%D    A75 A34 -> .curve= _15pt .plabel= r \t_{hg}f
%D    A62 A21 -> .curve= ^15pt .plabel= l \h(\t_C(gf))
%D    A83 A11 -> .mod= @^{c,(-300,-2835),(-800,-100),p} .plabel= r \t_h(fg)}
%D    A85 A13 -> .mod= @^{c,(3000,-2000),(2700,-500),p} .plabel= l \t_{hg}f
%D
%D ))
%D enddiagram
%D
$$\pu
  \def\f{\bar f}
  \def\g{\bar g}
  \def\h{\bar h}
  \let\t\tau
  \diag{barr-dedmat6}
$$
```

Output of Barr's code:



Output of my conversion of it to dednat6:



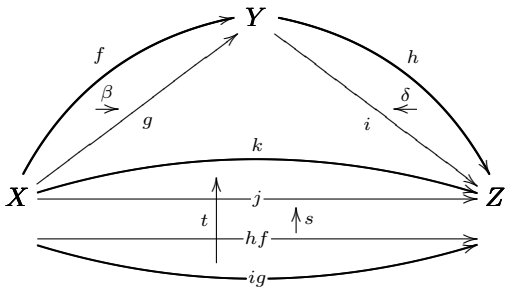
1.2 The triangle diagram

The source in diagxy for this triangle diagram can be found in diaxydoc.tex. I don't have support for "holes" in dednat6 yet, so I simplified the original diagram a bit; note that in the dednat6 version some arrows cross.

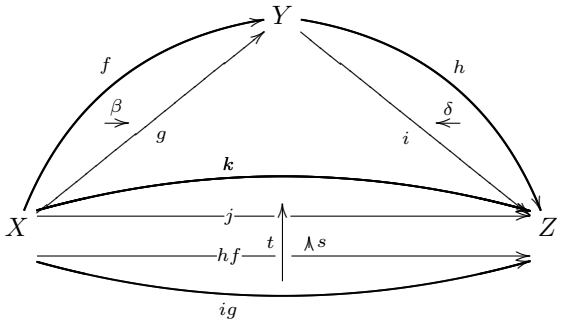
```
$$\bfig
  \node 1(1000,800)[Y]
  \node 21(0,0)[X]
  \node 22(2000,0)[Z]
  \node aa(300,400)[]
  \node ab(450,400)[]
  \node ba(1550,400)[]
  \node bb(1700,400)[]
  \arrow|a|/{@{>}@/^20pt/}/[21`1;f]
  \arrow|b|[21`1;g]
  \arrow[aa`ab;\beta]
  \arrow[bb`ba;\delta]
  \arrow|b|[1^22;i]
  \arrow|a|/{@{>}@/^20pt/}/[1`22;h]
  \arrow/{@{>}@/^15pt/@<5pt>^(.4)k}/[21^22;]
  \arrow/{@{>}@/^15pt/@<5pt>^(.4)k}/[21^22;]
  \arrow/{@{>}@<5pt>|(.4)j|(.5)\hole}/[21`22;]
  \arrow/{@{>}@<-10pt>|(.4){hf}|-\hole}/[21`22;]
  \arrow/{@{>}@/_15pt/@<-10pt>_(0.4){ig}}/[21`22;]
  \node c(1000,150)[]
  \node f(1000,-200)[]
  \arrow|l|[f^c;t]
  \node d(1100,25)[]
  \node e(1100,-75)[]
  \arrow|r|[e^d;s]
  \efig
$$
```

```
%D diagram TAC
%D 2Dx     100  +60  +60
%D 2D  100      Y
%D 2D          ^   \
%D 2D         /     v
%D 2D  +45 X ------> Z
%D 2D
%D (( X Y -> .curve= ^15pt sl^                  .plabel= a f
%D    X Y ->                                    .plabel= b g
%D    Y Z -> .curve= ^15pt sl^                  .plabel= a h
%D    Y Z ->                                    .plabel= b i
%D    X Z -> .curve= ^15pt                      .plabel= a k
%D    X Z ->                                    .plabel= m j
%D    X Z ->              .slide= -15pt         .plabel= m hf
%D    X Z -> .curve= _15pt .slide= -15pt        .plabel= m ig
%D
%D    X Y harrownodes nil 15 15  ->             .plabel= a \beta
%D    Y Z harrownodes 15  15 nil <-             .plabel= a \delta
%D
%D    X Z varrownodes 12 30 nil <- .slide= -15pt .plabel= l t
%D    X Z varrownodes 12 15 nil <- .slide=  15pt .plabel= r s
%D ))
%D enddiagram
%D
$$\pu
  \text{Edrx:} \quad \diag{TAC}
$$
```

Dednat6:



Barr:



2 Other diagrams

```
%D diagram HAFAGAKA
%D 2Dx     100    +30 +15 +15   +30
%D 2D  100             A
%D 2D                / | \
%D 2D               v  v  v
%D 2D  +25 HA --> FA --> GA --> KA
%D 2D
%D (( A HA -> A FA |-> A GA |-> A KA ->
%D    HA FA -> FA GA -> .plabel= b TA GA KA ->
%D    A FA GA midpoint -->
%D ))
%D enddiagram
%D
$$\pu
  \diag{HAFAGAKA}
$$
```

```
%D diagram XCX
%D 2Dx     100   +30   +30
%D 2D  100 A --> X --> C
%D 2D       \   | ^   ^
%D 2D        \  | |  /
%D 2D         v v | /
%D 2D  +30       Y
%D 2D
%D ren A ==> C
%D
%D (( A X -> .plabel= a f  X C -> .plabel= a g
%D    A Y -> .plabel= l kf Y C -> .plabel= r g\ell
%D    X Y -> sl_ .plabel= l k
%D    X Y <- sl^ .plabel= r \ell
%D ))
%D enddiagram
%D
$$\pu
  \diag{XCX}
$$
```