regtec — TikZ macros for RegT[*]

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Abstract

1   Examples

The classic regulator image on figure 1 was made from the code below:
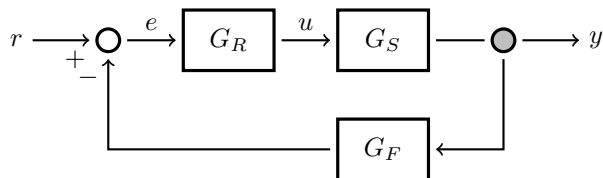

Figure 1:   Regulator with feedback.

```
\begin{tikzpicture}[thick]
  \matrix[
    column sep = 8mm, row sep = 6mm,
  ]{
    \node[rtsum] (E) {};
      & \node[rtbox] (R) {\(G_R\)}; & \node[rtbox] (S) {\(G_S\)};
      & \node[rtsplit] (U) {}; \\
    && \node[rtbox] (F) {\(G_F\)}; \\
  };

  \draw[<-] (E) -- node[near start, below] {\(+\)}
    ++(-1,0) node[left] {\(r\)};

  \draw[->] (E) -- node[midway, above] {\(e\)} (R);
  \draw[->] (R) -- node[midway, above] {\(u\)} (S);
  \draw[-]  (S) -- (U);
  \draw[->] (U) -- ++(1,0) node[right] {\(y\)};

  \draw[->] (U) |- (F);
  \draw[->] (F) -| node[pos = .9, left] {\(-\)} (E);

\end{tikzpicture}
```

2   Usage

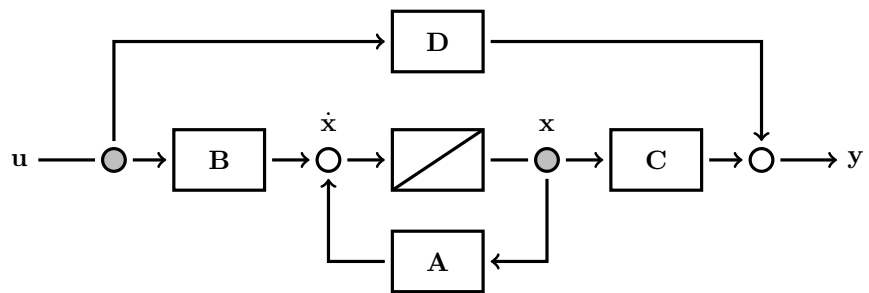In figure 3 are drawn the elementary blocks for control systems diagrams.

rtdiagram

Figure 2: MIMO System
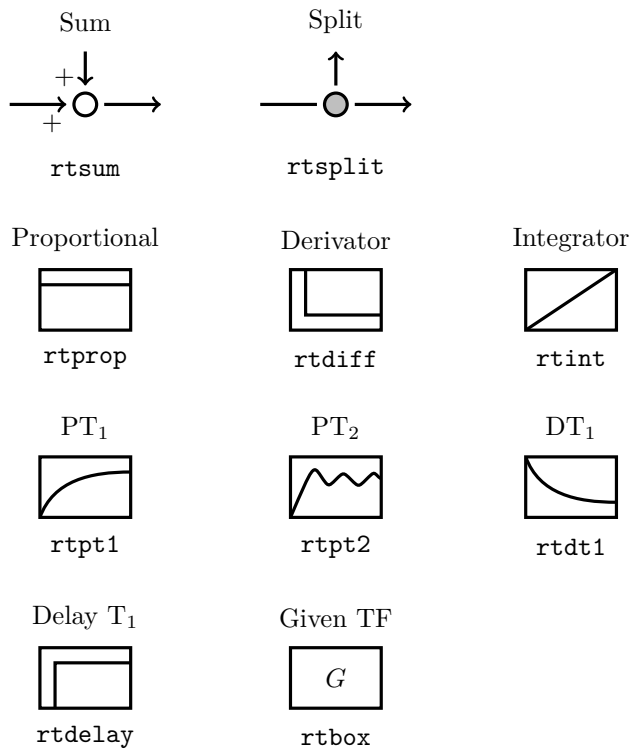

Figure 3: Blocks provided by the package.

3 Implementation

1 ⟨*package⟩

This package of course needs TikZ to work.

```
2  \RequirePackage{tikz}
3  \usetikzlibrary{calc}
4  \usetikzlibrary{positioning}
5  \tikzset{
6    rtsplit/.style = {
7      circle,
8      very thick,
9      draw = black,
10     fill = lightgray,
11     inner sep = 1mm,
12     outer sep = 1mm,
13     minimum size = 3mm,
14   },
15   rtbox/.style = {
16     very thick,
17     draw = black,
18     fill = white,
19     inner sep = 2mm,
20     outer sep = 1mm,
21     minimum width = 12mm,
22     minimum height = 8mm,
23   },
24   rtsum/.style = {
25     circle,
26     very thick,
27     draw = black,
28     fill = white,
29     inner sep = 1mm,
30     outer sep = 1mm,
31     minimum size = 3mm,
32   },
33   rtprop/.style = {
34     rtbox,
35     path picture = {
36       \draw[very thick]
37         ($(path picture bounding box.north west) - (0,.2)$)
38         --
39         ($(path picture bounding box.north east) - (0,.2)$);
40     }
41   },
42   rtint/.style = {
43     rtbox,
44     path picture = {
45       \draw[very thick] (path picture bounding box.south west)
46         -- (path picture bounding box.north east);
47     }
48   },
49   rtdiff/.style = {
50     rtbox,
51     path picture = {
52       \draw[very thick]
53         ($(path picture bounding box.north west) + (.2,0)$)
54         |-
55         ($(path picture bounding box.south east) + (0,.2)$);
56     },
57   },
58   rtdelay/.style = {
59     rtbox,
60     path picture = {
```

```
61      \draw[very thick]
62        ($(path picture bounding box.south west) + (.2,0)$)
63        |-
64        ($(path picture bounding box.north east) - (0,.2)$);
65      },
66    },
67    rtpt1/.style = {
68      rtbox,
69      path picture = {
70        \draw[very thick]
71          (path picture bounding box.south west)
72          to[out = 70, in = 180]
73          ($(path picture bounding box.north east) - (0,.2)$);
74      },
75    },
76    rtdt1/.style = {
77      rtbox,
78      path picture = {
79        \draw[very thick]
80          (path picture bounding box.north west)
81          to[out = -70, in = 180]
82          ($(path picture bounding box.south east) + (0,.2)$);
83      },
84    },
85    rtpt2/.style = {
86      rtbox,
87      path picture = {
88        \path (path picture bounding box.south west)
89          -- ++(.3,.7)  node (P1) {}
90          -- ++(.2,-.3) node (P2) {}
91          -- ++(.2,.2)  node (P3) {}
92          -- ++(.2,-.2) node (P4) {}
93          -- ++(.2,.2)  node (P5) {}
94          -- ++(.1,-.1) node (P6) {};
95        \draw[very thick]
96          (path picture bounding box.south west)
97          .. controls (P1) .. ($(P1)!.5!(P2)$)
98          .. controls (P2) .. ($(P2)!.5!(P3)$)
99          .. controls (P3) .. ($(P3)!.5!(P4)$)
100         .. controls (P4) .. ($(P4)!.5!(P5)$)
101         .. controls (P5) .. ($(P5)!.5!(P6)$)
102         .. controls (P6) .. ++(.2,0)
103         ;
104     },
105   }
106 }
```

rtdiagram

```
107 \newenvironment{rtdiagram}{%
108   \begin{tikzpicture}
109 }{%
110   \end{tikzpicture}
111 }

112 \endinput
113 ⟨/package⟩
```

4 Change History

5 Index

Numbers written in italic refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in roman refer to the code lines where the entry is used.