Exercise 5 - Hybrid Systems

1 Hybrid Modeling with BouncingBall

Locate the BouncingBall model in one of the hybrid modeling sections of DrModelica (e.g. Section 2.9), run it, change it slightly, and re-run it.

2 Square Signal

Make a square signal with a period of 1s and that starts at t = 2.5s. Note that it is possible to use either an equation or an algorithm solution. Hint: an easy way is to use sample(...) to generate events, and define a variable that switches sign at each event.

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model ...
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3 DC Motor - Generator

What is needed if you want to make a hybrid DC motor, i.e. a DC motor that also can act like a generator for a limited time? Make it work like a DC motor for the first 20s, then apply a counteracting torque on the outgoing axis for the next 20s, and then turn off the counteracting torque, i.e. you would like to have a torque pulse starting at 20s and lasting 20s. Draw the following connection diagram in a graphic model editor, and adjust the starting times and signal height for the Step1 and Step2 signal models to get the desired torque pulse.