

elem.	name	setting: description
*	all elements	<ul style="list-style-type: none"> • Mode: function scalar or vectorial • Type: switching with adjustable causality (no 0/1) • Block function tunable: input lock for protection against setting of features; exception: „value“; (not AB) • Power output available: optionally power output (no 0/1, TF, GY, AB); fields: vector output, otherwise scalar
S/D	source	<p>source / destination: switchable (causality: effort or flow)</p> <ul style="list-style-type: none"> • Value: fixed internal parameter (scalar or vector); deactivated by „Source extern“ • Source extern: input of an external parameter; used for control or non-linearities via an additional input S • Add IC[0]-Block: optionally IC-Block (initial zero)
0/1	node	<p>0-node / 1-node: switchable</p> <ul style="list-style-type: none"> • E0 / F0: connection to a bond graph element for computation of the nodes constant variable (F / E) • Fed power ports: number of „supplier“ bonds • Consumed power ports: number of “consumer” bonds • Alternative power variable input: node transformation with change of causality, if number of “consumed power ports” not less than 2; here: F1 / E1 → passing on of the nodes constant power variable (F / E) • Formulas: see “Forms of the node blocks appearance”;
R	consumer	<p>R-consumer (causality: resistor or conductance)</p> <ul style="list-style-type: none"> • Value: fixed internal parameter (scalar or matrix); deactivated by „Parameter non-linear ...“ • Parameter non-linear resp. extern calculated: input of an external parameter; used for non-linearities via an additional input NL
I/C	storage	<p>I-storage / C-storage: switchable (causality: integration or differentiation)</p> <ul style="list-style-type: none"> • Value: fixed internal parameter (scalar or matrix) • Momentum (M) output available: optionally additional output • Displacement (D) output available: optionally additional output • Reset integrator & D / M limitation available: optionally for M resp. D: set an upper and lower limit as well as a initial value; for power variable: reset integrator and set an output value for E resp. F if limitation for M resp. D is activated • Initial value for power variable output available: optionally initial value for effort resp. flow output

Description of bond graph elements (part 1)

TF	transformer	<p>power coupler (causality: left or right)</p> <ul style="list-style-type: none"> • Value: fixed internal parameter (scalar, vector or matrix); deactivated by „Parameter non-linear“ • Parameter non-linear: input of an external parameter; used for non-linearities via an additional input NL • Negative sign for „output“: optionally negative sign right
GY	gyrator	<p>power converter (causality: outer or inner)</p> <ul style="list-style-type: none"> • Value: fixed internal parameter (scalar, vector or matrix); deactivated by „Parameter non-linear“ • Parameter non-linear: input of an external parameter; used for non-linearities via an additional input NL • Negative sign for „output“: optionally negative sign right
RF	R-field	<p>R-field (causality: flow, effort or mixed)</p> <ul style="list-style-type: none"> • Gain-Matrix: fixed internal parameter (matrix); deactivated by „Parameter non-linear“ • Optional common gain: fixed internal parameter (initial value „1“ - scalar); possible common weighting factor; no deactivation by „Parameter non-linear“ • InputDimensionVector for F or E: specification of element numbers for each bond connection → row vector for e or f causality; → column vector or matrix for mixed causality: separation of e / f by semicolon and completion via zeros • Parameter non-linear: input of an external parameter; used for non-linearities via an additional input NL
IF/CF	Storage-field	<p>I-field / C-field: switchable (causality: integration, differentiation or mixed)</p> <ul style="list-style-type: none"> • Gain-Matrix: fixed internal parameter (matrix); deactivated by „Parameter non-linear“ • InputDimensionVector for F or E: specification of element numbers for each bond connection → row vector for e or f causality; → column vector or matrix for mixed causality: separation of e / f by semicolon and completion via zeros • Momentum (M) output available: optionally additional output • Displacement (D) output available: optionally additional output • Parameter non-linear: input of two external parameters (matrixes); used for non-linearities via additional inputs NL (before integration) and NL2 (after integration)
AB	activated bond	<p>measurement [active resp. activated bond graph connection]</p> <ul style="list-style-type: none"> • Type: set effort or flow identical zero optionally

Description of bond graph elements (part 2)

[Compare „BG elements and their properties“ regarding a summary, as well as “Combination of features of the examples“ regarding an use of the described properties.]