

1 Start einer zweistufigen Rakete

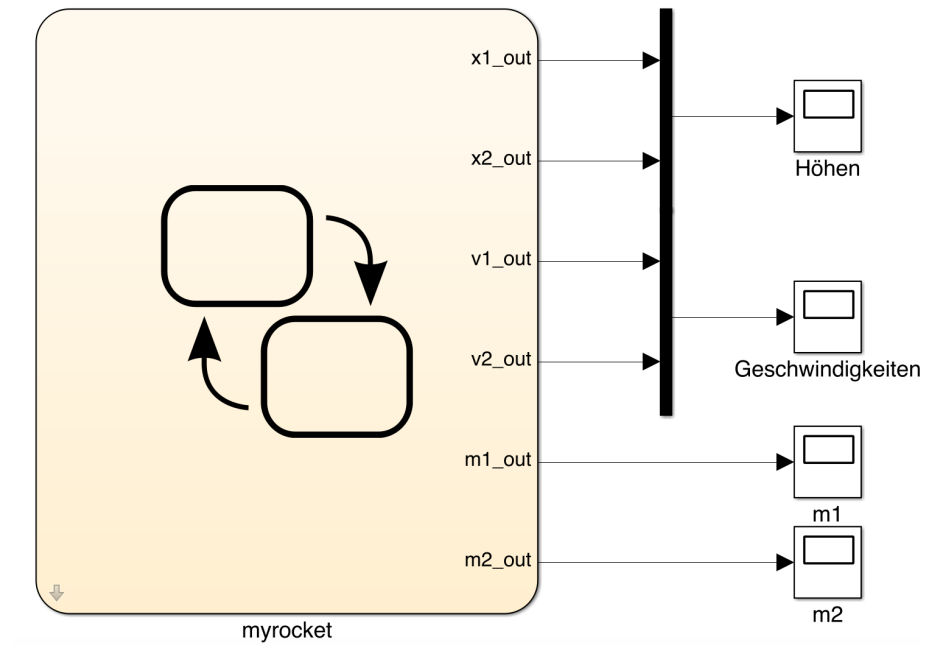
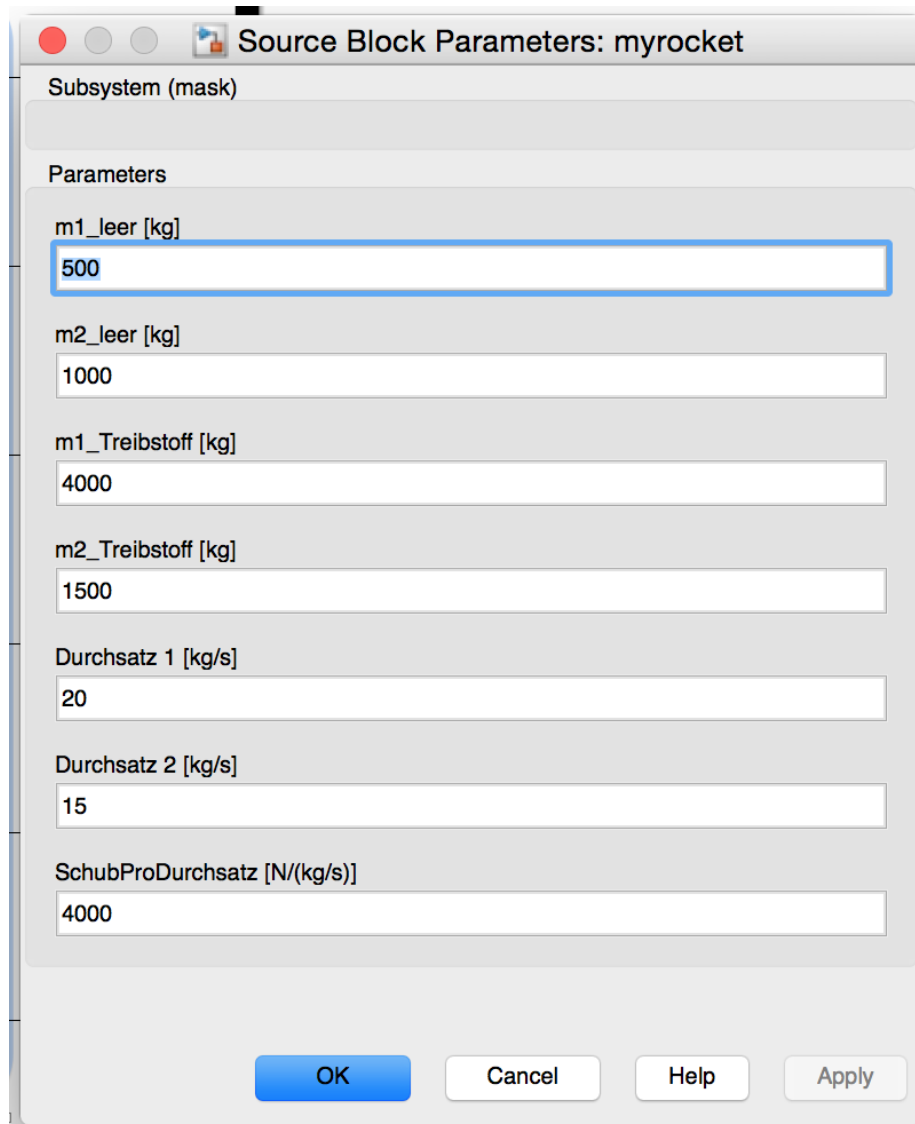


Abbildung 1: Simulink Stateflow



The image shows a MATLAB/Simulink dialog box titled "Source Block Parameters: myrocket". It contains a "Subsystem (mask)" section and a "Parameters" section. The "Parameters" section lists seven parameters with their units and current values: m1_leer [kg] (500), m2_leer [kg] (1000), m1_Treibstoff [kg] (4000), m2_Treibstoff [kg] (1500), Durchsatz 1 [kg/s] (20), Durchsatz 2 [kg/s] (15), and SchubProDurchsatz [N/(kg/s)] (4000). The "m1_leer [kg]" field is highlighted with a blue border. At the bottom are buttons for "OK", "Cancel", "Help", and "Apply".

Parameter	Unit	Value
m1_leer	[kg]	500
m2_leer	[kg]	1000
m1_Treibstoff	[kg]	4000
m2_Treibstoff	[kg]	1500
Durchsatz 1	[kg/s]	20
Durchsatz 2	[kg/s]	15
SchubProDurchsatz	[N/(kg/s)]	4000

Abbildung 2: Simulink Stateflow

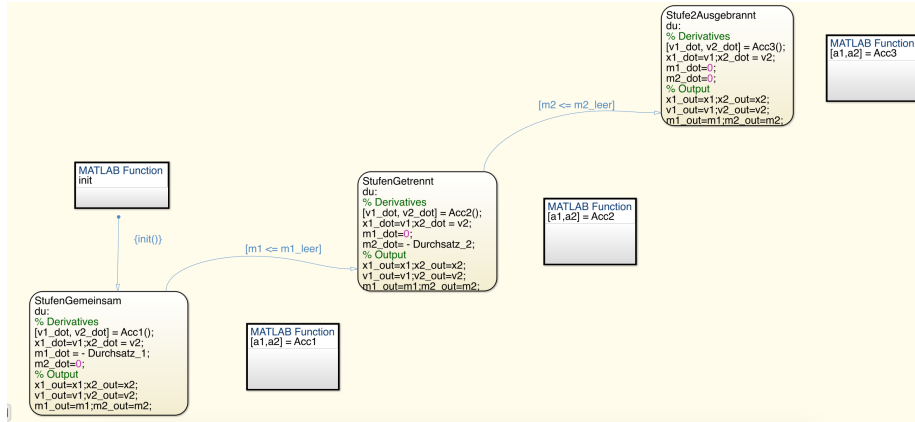


Abbildung 3: Simulink States

$$\begin{aligned}
 Acc1 &= & (1) \\
 mR &= m1 + m2 \\
 r1 &= x1 + rE \\
 Fs1 &= G * (mE * mR) / (r1 * r1) \\
 Schubkraft_1 &= Durchsatz_1 * SchubProDurchsatz \\
 a &= (Schubkraft_1 - Fs1) / (m1 + m2) \\
 a1 &= a \\
 a2 &= a
 \end{aligned}$$

$$\begin{aligned}
 Acc2 &= & (2) \\
 r1 &= x1 + rE \\
 Fs1 &= G * (mE * m1) / (r1 * r1) \\
 r2 &= x2 + rE \\
 Fs2 &= G * (mE * m2) / (r2 * r2) \\
 Schubkraft_2 &= Durchsatz_2 * SchubProDurchsatz \\
 a1 &= -Fs1 / m1 \\
 a2 &= (Schubkraft_2 - Fs2) / m2
 \end{aligned}$$

$$\begin{aligned}
 Acc3 &= & (3) \\
 r1 &= x1 + rE \\
 Fs1 &= G * (mE * m1) / (r1 * r1) \\
 r2 &= x2 + rE \\
 Fs2 &= G * (mE * m2) / (r2 * r2) \\
 a1 &= -Fs1 / m1 \\
 a2 &= -Fs2 / m2
 \end{aligned}$$

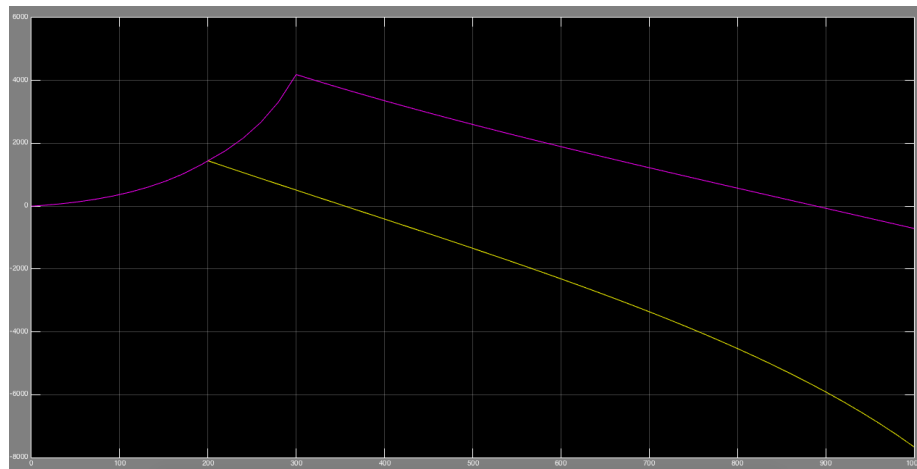


Abbildung 4: Geschwindigkeiten

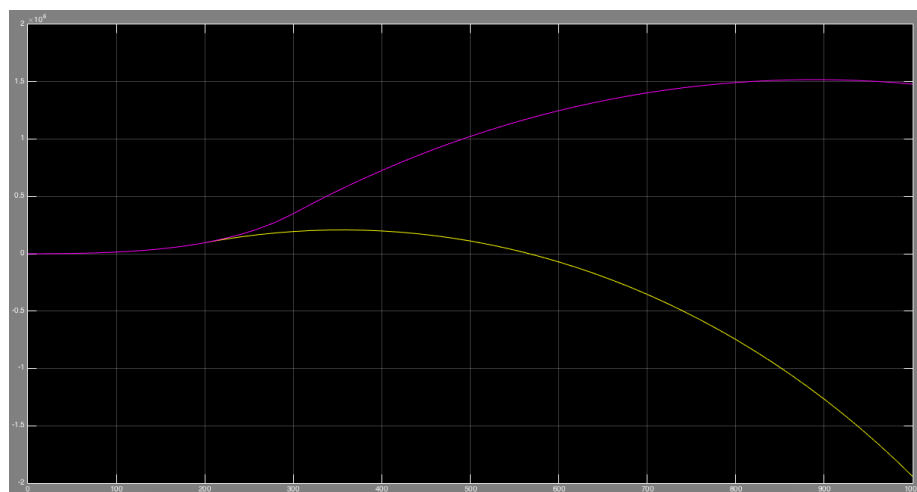


Abbildung 5: Höhen

2 Simulation eines schiefen Flippers