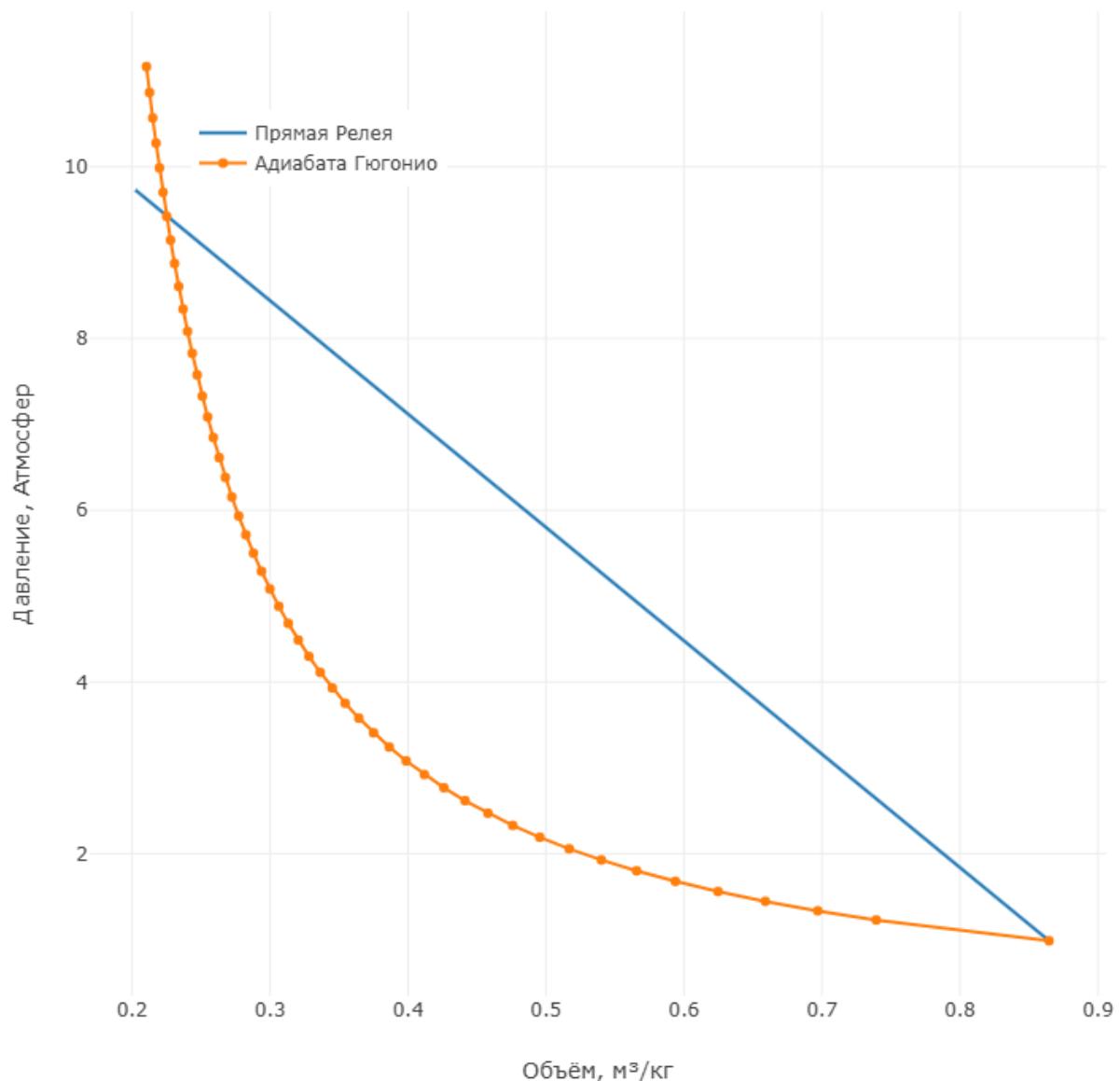


## Task1. Rayleigh Line and Hugoniot

Input:

- $P_\infty = 100000 \text{ Pa}$
- $T_\infty = 300 \text{ K}$
- $q = \text{O}_2:0.21 \text{ N}_2:0.79$
- $U = 1000 \text{ m/s}$
- $n = 50$

Ударная волна в воздухе, (Скорость=1000 м/с)



## Task2. Rayleigh Line, Hugoniot and CJ marker

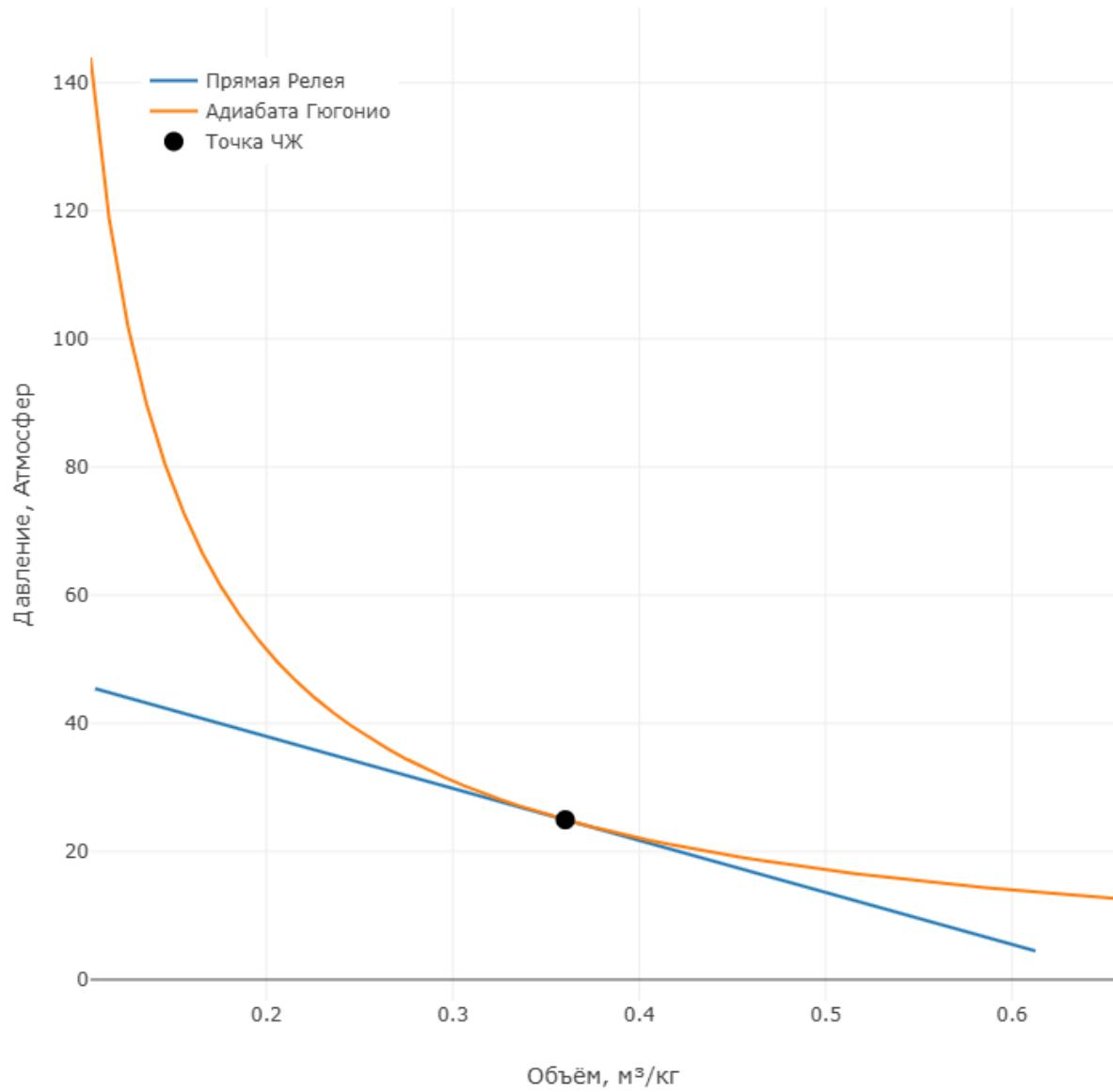
Input:

- $P_{\infty} = 100000 \text{ Pa}$
- $T_{\infty} = 300 \text{ K}$
- $q = \text{C3H8:1 O2:1}$
- $v_{\text{steps}} = 100$
- $v_{\text{min\_factor}} = 0.3$
- $v_{\text{max\_factor}} = 1.7$

Output:

- $D = 1879.81 \text{ m/s}$
- $V_{\text{CJ}} = 0.360314 \text{ m}^3/\text{kg}$
- $P_{\text{CJ}} = 24.946 \text{ atm}$
- $T_{\text{CJ}} = 1625.46 \text{ K}$

Скорость ЧЖ = 1879.8 м/с



### Task 3. CJ Speed, P, (u) and T, (u)

Input:

P<sub>•</sub> = 100000 Pa

T<sub>•</sub> = 300 K

q\_template = H2:1 O2:{u}

u\_min = 0.1000

u\_max = 1.0000

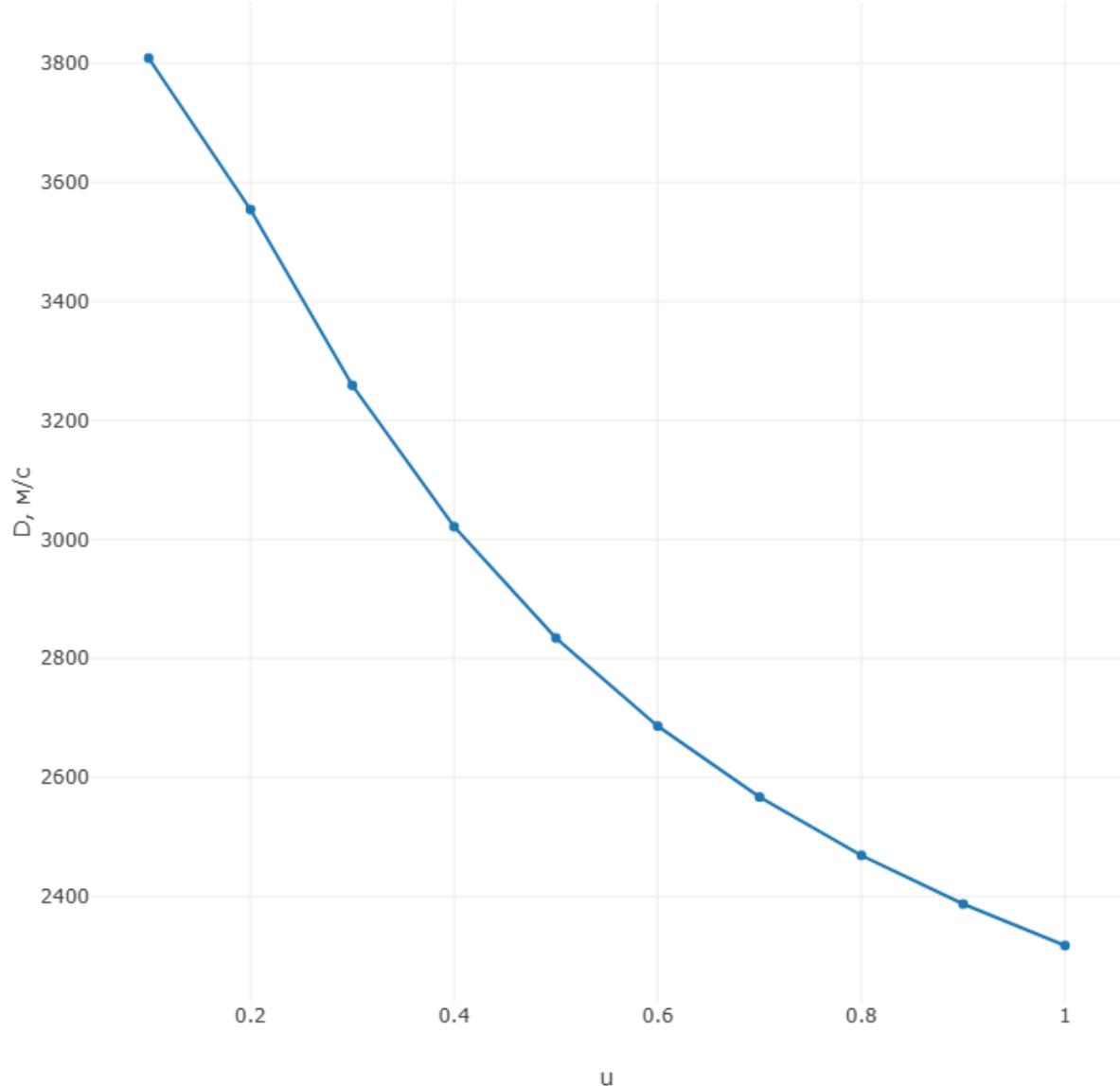
n\_points = 10

Output:

u = 0.100 !' D = 3809.26 m/s, P<sub>,</sub> = 12.540 atm, T<sub>,</sub> = 2408.3 K  
u = 0.200 !' D = 3554.65 m/s, P<sub>,</sub> = 16.661 atm, T<sub>,</sub> = 3235.3 K  
u = 0.300 !' D = 3259.09 m/s, P<sub>,</sub> = 18.002 atm, T<sub>,</sub> = 3544.1 K  
u = 0.400 !' D = 3021.40 m/s, P<sub>,</sub> = 18.379 atm, T<sub>,</sub> = 3653.3 K  
u = 0.500 !' D = 2834.29 m/s, P<sub>,</sub> = 18.372 atm, T<sub>,</sub> = 3670.4 K  
u = 0.600 !' D = 2686.08 m/s, P<sub>,</sub> = 18.229 atm, T<sub>,</sub> = 3646.7 K  
u = 0.700 !' D = 2566.75 m/s, P<sub>,</sub> = 18.028 atm, T<sub>,</sub> = 3605.3 K  
u = 0.800 !' D = 2468.80 m/s, P<sub>,</sub> = 17.817 atm, T<sub>,</sub> = 3557.0 K  
u = 0.900 !' D = 2386.87 m/s, P<sub>,</sub> = 17.607 atm, T<sub>,</sub> = 3506.6 K  
u = 1.000 !' D = 2317.14 m/s, P<sub>,</sub> = 17.400 atm, T<sub>,</sub> = 3456.2 K

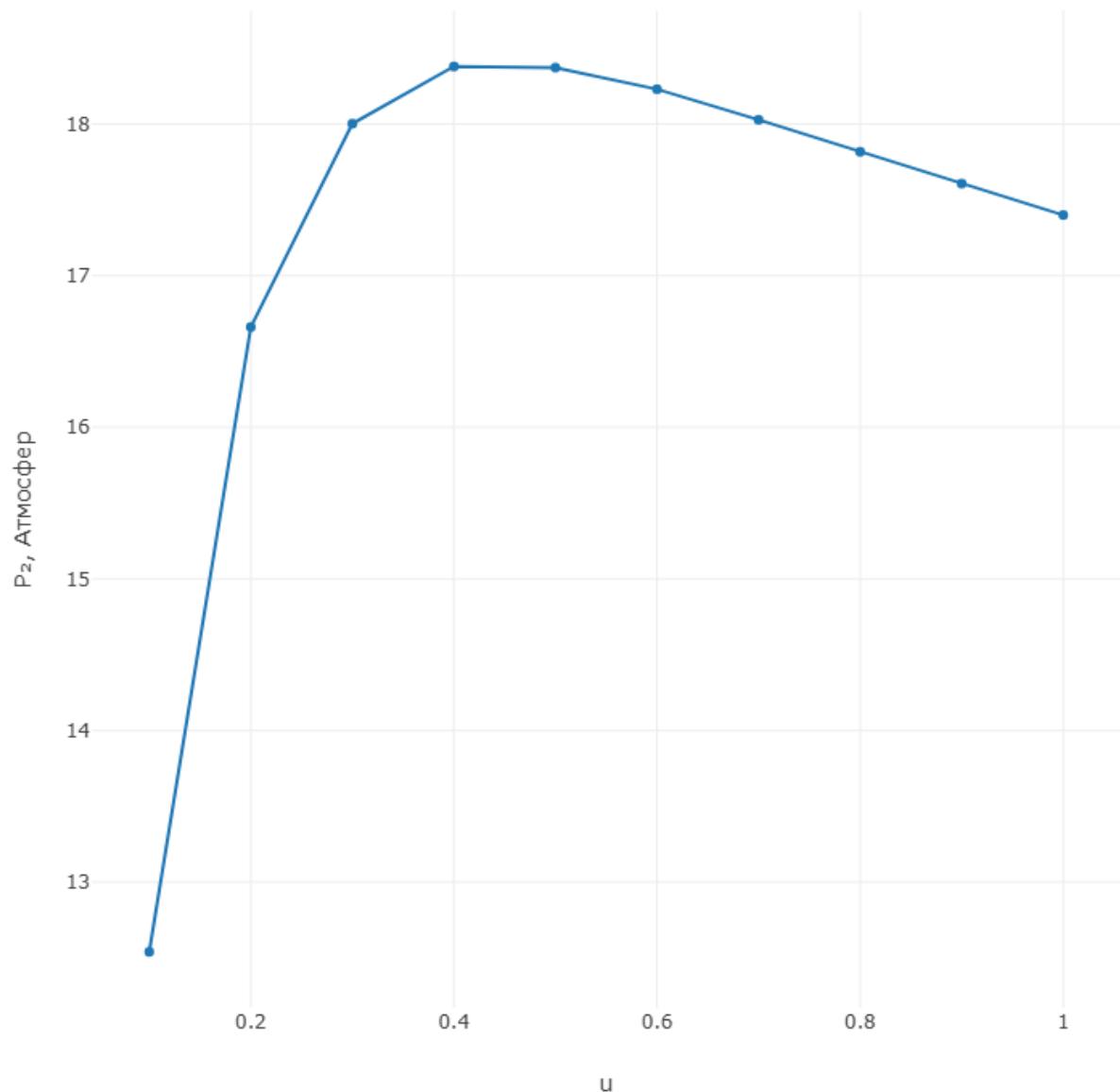
## D vs u

Зависимость D от u



P<sub>2</sub>, vs u

Зависимость P<sub>2</sub> от u



T, vs u

Зависимость  $T_2$  от u

