

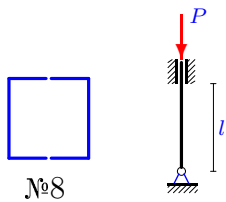
Критическая сила сжатого стержня,

Найти математическое ожидание и дисперсию критической силы P центрально сжатого стержня длиной l , где l — случайная величина, заданная рядом распределения $p = [0.1, 0.3, 0.5, 0.1]$. Известно симметричное поперечное сечение стержня, составленное из двух или четырех прокатных профилей (ГОСТ 8239-89, ГОСТ 8240-89, ГОСТ 8509-86), и схема закрепления. Модуль упругости материала $E = 2 \cdot 10^5$ МПа. При гибкости меньшей $\lambda = \pi\sqrt{E/\sigma_{\text{шц}}}$ пользоваться формулой Ясинского $\sigma_{\text{кр}} = a - b\lambda$, где $a = 310$ МПа, $b = 1.14$ МПа, $\sigma_{\text{шц}} = 195$ МПа.

Задача L-18.1.

1

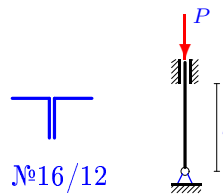
$$l = [3, 3.1, 3.2, 3.3] \text{ м.}$$



Задача L-18.2.

1

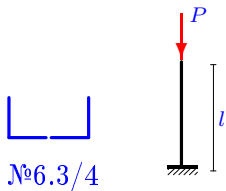
$$l = [12, 12.1, 12.2, 12.3] \text{ м.}$$



Задача L-18.3.

1

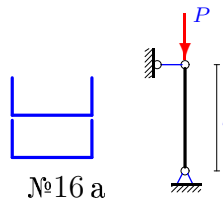
$$l = [1, 1.02, 1.04, 1.06] \text{ м.}$$



Задача L-18.4.

1

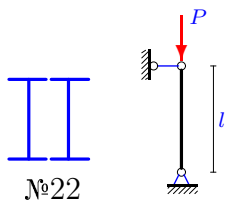
$$l = [5, 5.05, 5.1, 5.15] \text{ м.}$$



Задача L-18.5.

1

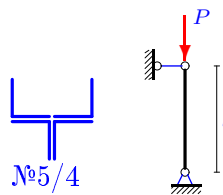
$$l = [9, 9.1, 9.2, 9.3] \text{ м.}$$



Задача L-18.6.

1

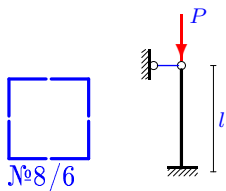
$$l = [2, 2.05, 2.1, 2.15] \text{ м.}$$



Задача L-18.7.

1

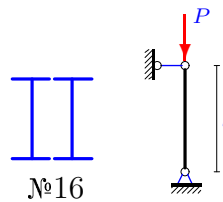
$$l = [11, 11.05, 11.1, 11.15] \text{ м.}$$



Задача L-18.8.

1

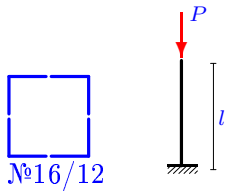
$$l = [5, 5.1, 5.2, 5.3] \text{ м.}$$



Задача L-18.9.

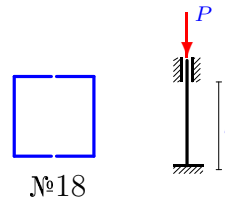
1

$$l = [15, 15.1, 15.2, 15.3] \text{ м.}$$

**Задача L-18.10.**

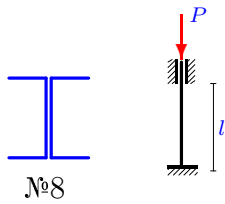
1

$$l = [13, 13.05, 13.1, 13.15] \text{ м.}$$

**Задача L-18.11.**

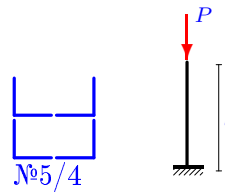
1

$$l = [3, 3.1, 3.2, 3.3] \text{ м.}$$

**Задача L-18.12.**

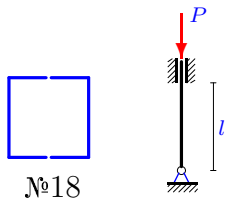
1

$$l = [1, 1.01, 1.02, 1.03] \text{ м.}$$

**Задача L-18.13.**

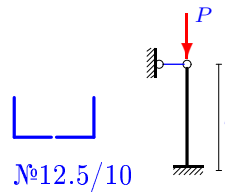
1

$$l = [10, 10.1, 10.2, 10.3] \text{ м.}$$

**Задача L-18.14.**

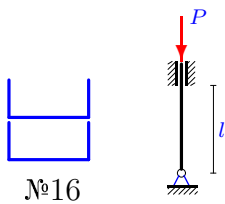
1

$$l = [7, 7.1, 7.2, 7.3] \text{ м.}$$

**Задача L-18.15.**

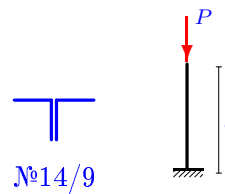
1

$$l = [6, 6.05, 6.1, 6.15] \text{ м.}$$

**Задача L-18.16.**

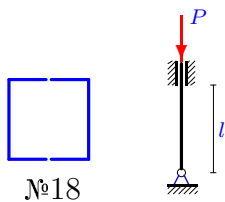
1

$$l = [3, 3.1, 3.2, 3.3] \text{ м.}$$

**Задача L-18.17.**

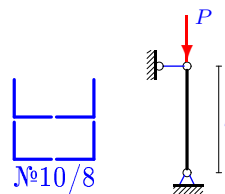
1

$$l = [10, 10.1, 10.2, 10.3] \text{ м.}$$

**Задача L-18.18.**

1

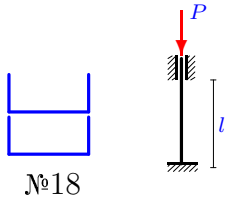
$$l = [9, 9.1, 9.2, 9.3] \text{ м.}$$



Задача L-18.19.

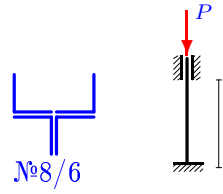
1

$$l = [10, 10.1, 10.2, 10.3] \text{ м.}$$

**Задача L-18.20.**

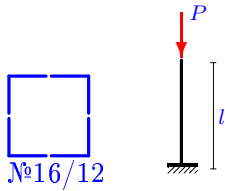
1

$$l = [8, 8.1, 8.2, 8.3] \text{ м.}$$

**Задача L-18.21.**

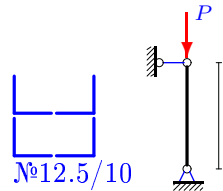
1

$$l = [15, 15.1, 15.2, 15.3] \text{ м.}$$

**Задача L-18.22.**

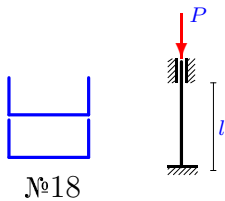
1

$$l = [14, 14.05, 14.1, 14.15] \text{ м.}$$

**Задача L-18.23.**

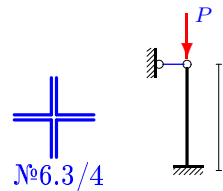
1

$$l = [10, 10.1, 10.2, 10.3] \text{ м.}$$

**Задача L-18.24.**

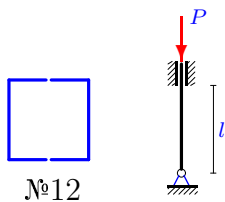
1

$$l = [3, 3.05, 3.1, 3.15] \text{ м.}$$

**Задача L-18.25.**

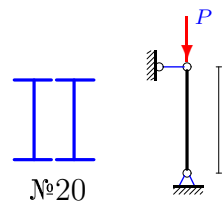
1

$$l = [6, 6.05, 6.1, 6.15] \text{ м.}$$

**Задача L-18.26.**

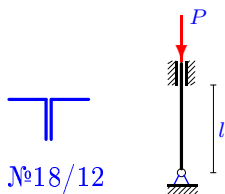
1

$$l = [8, 8.1, 8.2, 8.3] \text{ м.}$$

**Задача L-18.27.**

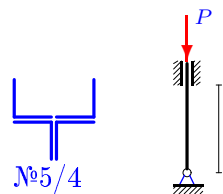
1

$$l = [14, 14.1, 14.2, 14.3] \text{ м.}$$

**Задача L-18.28.**

1

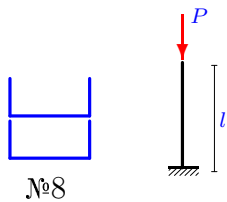
$$l = [2, 2.1, 2.2, 2.3] \text{ м.}$$



Задача L-18.29.

1

$l = [1, 1.02, 1.04, 1.06]$ м.

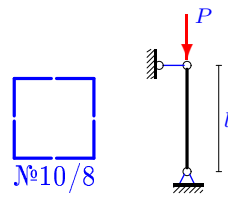


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Задача L-18.30.

1

$l = [12, 12.1, 12.2, 12.3]$ м.



Ответы.

Критическая сила сжатого стержня,

22-Jan-16

№	F	J	i	μ	λ	$P_{кр}$	$M(P_{кр})$	$D(P_{кр})$	
	см ²	см ⁴	см	—	—	кН			
1	17.960	155.560	2.943	0.7	71.355	410.665	402.874	15.1777	(пл)
2	74.800	1826.000	4.941	0.7	170.012	510.825	497.535	43.1501	
3	9.920	37.800	1.952	2.0	102.457	186.536	175.274	30.0490	
4	39.000	608.440	3.950	1.0	126.588	480.405	465.480	54.1794	
5	61.200	2165.300	5.948	1.0	151.307	527.670	509.515	79.9389	
6	15.560	66.472	2.067	1.0	96.764	310.716	300.150	52.9622	(пл)
7	37.520	1494.529	6.311	0.7	122.003	497.568	490.428	12.5846	
8	40.400	779.861	4.394	1.0	113.803	615.754	578.580	327.4315	
9	149.600	23816.898	12.618	2.0	237.763	522.363	511.438	29.2940	
10	41.400	1231.989	5.455	0.5	119.154	575.586	568.582	12.1308	
11	17.960	56.421	1.772	0.5	84.630	383.486	374.244	21.3504	(пл)
12	15.560	134.090	2.936	2.0	68.130	361.509	359.575	0.9347	(пл)
13	41.400	1231.989	5.455	0.7	128.320	496.296	480.877	57.8229	
14	48.600	720.000	3.849	0.7	127.306	591.930	565.983	161.8925	
15	36.200	497.288	3.706	0.7	113.318	556.467	541.990	51.2054	
16	49.400	932.000	4.344	2.0	138.136	511.026	461.485	562.6077	
17	41.400	1231.989	5.455	0.7	128.320	496.296	480.877	57.8229	
18	62.400	2148.000	5.867	1.0	153.397	523.455	505.444	78.6666	
19	41.400	679.150	4.050	0.5	123.449	536.235	519.576	67.5041	
20	37.520	407.950	3.297	0.5	121.308	503.288	483.885	90.9630	
21	149.600	23816.898	12.618	2.0	237.763	522.363	511.438	29.2940	
22	97.200	5236.875	7.340	1.0	190.733	527.407	521.443	8.8030	
23	41.400	679.150	4.050	0.5	123.449	536.235	519.576	67.5041	
24	19.840	132.265	2.582	0.7	81.333	431.084	426.178	6.0160	(пл)
25	26.600	418.723	3.968	0.7	105.859	468.552	456.362	36.3039	
26	53.600	1570.000	5.412	1.0	147.816	484.227	465.559	84.2036	
27	84.400	2634.000	5.586	0.7	175.424	541.369	529.255	35.9723	
28	15.560	66.472	2.067	0.7	67.735	362.209	352.597	23.0979	(пл)
29	17.960	97.440	2.329	2.0	85.865	380.957	375.332	7.9121	(пл)
30	62.400	3867.900	7.873	1.0	152.418	530.203	516.410	46.4861	

L-18 файл о18L1A