

Problem 14-1, 14-2, & 14-3

Element 1

xn	yn	xf	yf	L
0.0	0.0	4.0	3.0	5.0

	5	6	1	2	
AE	0.1	0.1	-0.1	-0.1	5
	0.1	0.1	-0.1	-0.1	6
	-0.1	-0.1	0.1	0.1	1
	-0.1	-0.1	0.1	0.1	2

Element 2

xn	yn	xf	yf	L
4.0	3.0	10.0	3.0	6.0

	1	2	3	4	
AE	0.2	0.0	-0.2	0.0	1
	0.0	0.0	0.0	0.0	2
	-0.2	0.0	0.2	0.0	3
	0.0	0.0	0.0	0.0	4

Element 3

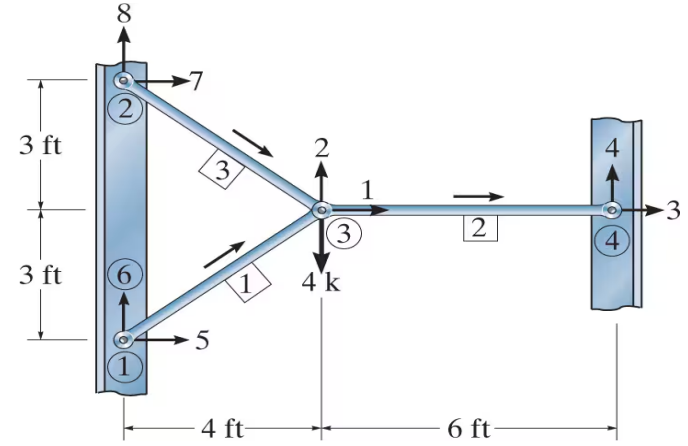
xn	yn	xf	yf	L
0.0	6.0	4.0	3.0	5.0

	7	8	1	2	
AE	0.1	-0.1	-0.1	0.1	7
	-0.1	0.1	0.1	-0.1	8
	-0.1	0.1	0.1	-0.1	1
	0.1	-0.1	-0.1	0.1	2

λ_x	λ_y
0.8	0.6

λ_x	λ_y
1	0

λ_x	λ_y
0.8000	-0.6000



$$\frac{AE}{L} \begin{bmatrix} \lambda_x^2 & \lambda_x \lambda_y & -\lambda_x^2 & -\lambda_x \lambda_y \\ \lambda_x \lambda_y & \lambda_y^2 & -\lambda_x \lambda_y & -\lambda_y^2 \\ -\lambda_x^2 & -\lambda_x \lambda_y & \lambda_x^2 & \lambda_x \lambda_y \\ -\lambda_x \lambda_y & -\lambda_y^2 & \lambda_x \lambda_y & \lambda_y^2 \end{bmatrix} \begin{bmatrix} N_x \\ N_y \\ F_x \\ F_y \end{bmatrix}$$

	1	2	3	4	5	6	7	8	
k1	0.1280	0.0960			-0.1280	-0.0960			1
	0.0960	0.0720			-0.0960	-0.0720			2
									3
									4
	-0.1280	-0.0960			0.1280	0.0960			5
	-0.0960	-0.0720			0.0960	0.0720			6
									7
									8

	1	2	3	4	5	6	7	8	
k2	0.1667	0.0000	-0.1667	0.0000					1
	0.0000	0.0000	0.0000	0.0000					2
	-0.1667	0.0000	0.1667	0.0000					3
	0.0000	0.0000	0.0000	0.0000					4
									5
									6
									7
									8

	1.0	2.0	3.0	4.0	5.0	6.0	7	8	
k3	0.1280	-0.0960					-0.1280	0.0960	1
	-0.0960	0.0720					0.0960	-0.0720	2
									3
									4
									5
									6
	-0.1280	0.0960					0.1280	-0.0960	7
	0.0960	-0.0720					-0.0960	0.0720	8

	1	2	3	4	5	6	7	8	
K	0.4227	0.0000	-0.1667	0.0000	-0.1280	-0.0960	-0.1280	0.0960	1
	0.0000	0.1440	0.0000	0.0000	-0.0960	-0.0720	0.0960	-0.0720	2
	-0.1667	0.0000	0.1667	0.0000	0.0000	0.0000	0.0000	0.0000	3
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4
	-0.1280	-0.0960	0.0000	0.0000	0.1280	0.0960	0.0000	0.0000	5
	-0.0960	-0.0720	0.0000	0.0000	0.0960	0.0720	0.0000	0.0000	6
	-0.1280	0.0960	0.0000	0.0000	0.0000	0.0000	0.1280	-0.0960	7
	0.0960	-0.0720	0.0000	0.0000	0.0000	0.0000	-0.0960	0.0720	8

AE

	1	2	3	4	5	6	7	8	
K	6128.7	0.0	-2416.7	0.0	-1856.0	-1392.0	-1856.0	1392.0	1
	0.0	2088.0	0.0	0.0	-1392.0	-1044.0	1392.0	-1044.0	2
	-2416.7	0.0	2416.7	0.0	0.0	0.0	0.0	0.0	3
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4
	-1856.0	-1392.0	0.0	0.0	1856.0	1392.0	0.0	0.0	5
	-1392.0	-1044.0	0.0	0.0	1392.0	1044.0	0.0	0.0	6
	-1856.0	1392.0	0.0	0.0	0.0	0.0	1856.0	-1392.0	7
	1392.0	-1044.0	0.0	0.0	0.0	0.0	-1392.0	1044.0	8

$E = 2.90E+04$ ksi
 $A = 0.5000$ in²

	K [k/ft]		Q [k]	D [ft] = K ⁻¹ Q	D [in] = K ⁻¹ Q
	1	2			
	6128.7	0.0	0	0.000000	0
	0.0	2088.0	-4	-0.001916	-0.022989
				1	in.
				2	in.

q1					D		
					0.00000	5	
	$-\lambda x$	$-\lambda y$	λx	λy	0.00000	6	
	AE/L	-0.8	-0.6	0.8	0.6	0.00000	1
					-0.00192	2	
						-3.33	kN

q2					D		
					0.00000	1	
	$-\lambda x$	$-\lambda y$	λx	λy	-0.00192	2	
	AE/L	-1.0000	0.0000	1.0000	0.0000	0.00000	3
					0.00000	4	
						0.00	kN

q3					D		
					0.00000	7	
	$-\lambda x$	$-\lambda y$	λx	λy	0.00000	8	
	AE/L	-0.8000	0.6000	0.8000	-0.6000	0.00000	1
					-0.00192	2	
						3.33	kN