ANEXO C: TABLAS PARA EL DISEÑO DE LOSAS

(J.Hahn "Vigas continuas, pórticos, placas y vigas flotantes sobre lecho elástico")

Valores numéricos según Marcus (sin armadura a torsión)

Valores numéricos según Czerny

Caso 1

Marcus:

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
k	1.35	1.35	1.34	1.33	1.32	1.30	1.28	1.27	1.25	1.23	1.22	1.20	1.18	1.15	1.12
Δ	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Δx	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Δy	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Czerny:

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
mx	27.2	25.8	24.6	23.7	22.9	22.3	21.8	21.4	21.0	20.7	20.5	20.4	20.3	20.3	20.8
my	27.2	28.9	30.7	32.7	34.9	37.5	40.2	43.0	45.9	48.9	52.0	54.9	57.9	69.3	80.6
mex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mey	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mxy	21.6	21.7	21.8	21.9	22.1	22.4	22.7	23.1	23.5	23.9	24.4	24.9	25.4	27.7	30.2

Caso 2a

Marcus:

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
k	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Δ	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Δx	0.05	0.06	0.07	0.09	0.11	0.14	0.18	0.21	0.24	0.27	0.30	0.33	0.35	0.43	0.51
Δy	0.25	0.30	0.35	0.39	0.44	0.49	0.54	0.59	0.64	0.70	0.75	0.79	0.83	0.99	1.15

Czerny:

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
mx	31.4	30.7	30.0	29.7	29.4	29.2	29.1	29.2	29.4	29.6	29.8	30.1	30.4	32.0	34.2
my	41.2	45.4	49.6	54.0	58.5	62.9	67.3	71.7	76.0	79.7	83.4	86.9	90.4	106.0	118.0
mex	11.9	11.9	12.0	12.1	12.2	12.4	12.6	12.8	13.0	13.2	13.5	13.8	14.1	15.1	16.6
mey	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mxy	26.2	26.8	27.4	28.1	28.8	29.6	30.5	31.3	32.2	33.1	34.1	35.1	36.1	40.3	44.8

Caso 2b

Marcus:

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
k	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Δ	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Δx	0.25	0.21	0.19	0.16	0.14	0.12	0.11	0.09	0.08	0.08	0.08	0.07	0.07	0.07	0.07
Δy	0.05	0.04	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Czerny:

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
mx	41.2	37.9	35.1	32.9	31.1	29.6	28.3	27.2	26.3	25.6	24.9	24.4	24.0	23.0	22.8
my	29.4	30.5	31.7	33.1	34.7	36.5	38.6	40.8	43.1	45.7	48.4	51.1	53.8	65.2	77.6
mex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mey	11.9	11.9	12.0	12.0	12.1	12.3	12.5	12.7	12.9	13.1	13.3	13.6	13.9	15.1	16.4
mxy	26.2	25.8	25.5	25.3	25.2	25.1	25.2	25.4	25.6	25.8	26.1	26.5	26.9	28.6	30.8

Caso 3a

Marcus:

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
k	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Δ	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Δx	0.37	0.43	0.50	0.57	0.64	0.71	0.78	0.85	0.92	0.99	1.05	1.11	1.15	1.15	1.15
Δy	1.04	1.15	1.28	1.40	1.53	1.66	1.78	1.90	2.02	2.14	2.24	2.34	2.42	2.42	2.42

Czerny:

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
mx	35.1	35.0	34.9	35.1	35.3	35.7	36.1	36.6	37.3	37.9	38.7	39.4	40.3	43.9	48.2
my	61.7	68.0	73.9	79.9	85.8	90.8	95.5	100.3	105.0	109.5	114.0	118.5	123.0	139.0	154.0
mex	14.3	14.6	14.9	15.2	15.6	16.0	16.4	16.8	17.3	17.7	18.2	18.7	19.2	21.5	24.0
mey	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mxy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Caso 3b

Marcus:

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
k	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Δ	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Δx	1.04	0.94	0.85	0.77	0.70	0.64	0.59	0.54	0.49	0.45	0.41	0.38	0.35	0.35	0.35
Δy	0.37	0.32	0.27	0.22	0.18	0.14	0.10	0.07	0.05	0.03	0.02	0.01	0.01	0.01	0.01

Czerny:

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
mx	63.3	56.4	50.7	46.1	42.5	39.5	37.0	34.9	33.2	31.8	30.6	29.5	28.6	26.3	25.0
my	35.1	35.6	36.2	37.0	38.0	39.2	40.6	42.2	44.0	46.0	48.2	50.6	53.1	66.2	84.8
mex	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mey	14.3	14.1	14.0	13.9	13.8	13.8	13.9	13.9	14.0	14.1	14.2	14.4	14.7	15.7	16.8
mxy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Apoyo 4

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
mx	40.2	38.3	36.8	34.6	34.8	34.2	33.8	33.6	33.5	33.4	33.3	33.3	33.4	34.8	35.8
my	40.2	43.1	46.2	49.4	52.8	57.0	61.9	66.7	71.3	75.5	79.6	83.8	88.0	114.0	120.0
mex	14.3	14.1	14.0	13.9	13.8	13.8	13.9	13.9	14.0	14.2	14.4	14.7	15.1	16.0	16.8
mey	14.3	14.6	15.0	15.3	15.7	16.1	16.6	17.1	17.6	18.1	18.6	19.1	19.6	21.8	24.4
mxy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
k	1.15	1.15	1.15	1.14	1.14	1.14	1.13	1.13	1.12	1.12	1.11	1.11	1.10	1.10	1.10
Δ	0.26	0.27	0.28	0.29	0.30	0.32	0.34	0.36	0.38	0.40	0.42	0.44	0.46	0.46	0.46
Δx	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Δy	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Apoyo 5a

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
mx	44.1	42.6	41.6	41.0	40.6	40.4	40.3	40.4	40.6	40.9	41.3	41.8	42.5	45.4	49.0
my	59.5	61.2	66.5	72.0	77.5	83.0	89.5	95.0	101.0	107.0	114.0	121.0	129.0	160.0	194.0
mex	16.2	16.2	16.3	16.5	16.7	16.9	17.2	17.5	17.8	18.2	18.6	19.0	19.5	21.4	23.6
mey	18.3	18.9	19.5	20.2	20.9	21.7	22.6	23.5	24.4	25.3	26.2	27.1	28.0	31.7	35.4
mxy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
k	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Δ	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Δx	0.61	0.65	0.70	0.75	0.81	0.87	0.93	0.99	1.04	1.09	1.14	1.19	1.24	1.24	1.24
Δy	0.84	0.90	0.96	1.02	1.09	1.16	1.22	1.29	1.36	1.43	1.49	1.55	1.60	1.60	1.60

Apoyo 5b

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
mx	59.5	54.7	50.7	47.5	44.9	42.9	41.3	40.1	39.2	38.4	37.8	37.7	37.7	37.6	37.5
my	44.1	45.9	48.1	50.7	53.7	57.1	61.0	65.4	70.4	76.1	82.5	89.5	97.0	143.0	202.0
mex	18.3	17.5	16.9	16.5	16.2	16.0	15.8	15.7	15.7	15.7	15.8	15.9	16.1	16.7	17.6
mey	16.2	16.2	16.3	16.4	16.6	16.9	17.3	17.7	18.1	18.6	19.0	19.5	20.0	22.1	24.6
mxy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
k	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Δ	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Δx	0.84	0.80	0.76	0.74	0.72	0.71	0.70	0.70	0.69	0.69	0.69	0.68	0.68	0.68	0.68
Δy	0.61	0.58	0.55	0.53	0.51	0.50	0.49	0.48	0.47	0.47	0.46	0.46	0.46	0.46	0.46

Apoyo 6

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
mx	56.8	53.5	50.7	48.8	47.2	46.1	45.2	44.9	44.6	44.5	44.4	45.2	46.1	48.8	50.0
my	56.8	61.2	66.3	72.2	78.9	86.7	95.6	105.6	116.6	128.5	140.5	152.0	163.0	190.0	210.0
mex	19.40	19.00	18.80	18.70	18.60	18.70	19.00	19.00	19.20	19.50	19.80	20.10	20.50	22.00	24.00
mey	19.40	19.80	20.30	20.90	21.50	22.20	22.90	23.70	24.50	25.30	26.20	27.00	27.90	31.40	35.00
mxy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ε =	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.80	2.00
k	1.03	1.04	1.05	1.07	1.10	1.13	1.17	1.21	1.24	1.28	1.31	1.35	1.39	1.39	1.39
Δ	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Δx	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Δy	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

si k = --- se considera k=1

si Δx = --- se considera

si Δy = ---

Δx =
Δy =
Δ

Factores φ

Apoyo	ε = 1.00	1.10	1.20	1.30	1.40	1.50
1	1.00	1.00	1.00	1.00	1.00	1.00
2a	0.80	0.80	0.80	0.80	0.80	0.80
2b	0.80	0.88	0.91	0.93	0.94	0.95
3a	0.60	0.60	0.60	0.60	0.60	0.60
3b	0.60	0.66	0.72	0.78	0.84	0.88
4	0.66	0.70	0.72	0.74	0.75	0.76
5a	0.58	0.58	0.58	0.59	0.59	0.59
5b	0.58	0.61	0.66	0.70	0.74	0.75
6	0.53	0.55	0.56	0.56	0.57	0.58