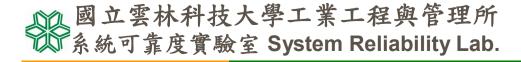
Three-Quarter Replicates of 2⁴ and 2⁵ Designs

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Defined by $I=\pm ABCD$ 主效應皆可估計 但二因子交互作用未被估計

■ 使用Three-Quarter Replicates

 \blacksquare 2⁴⁻² Defined by I=BD=ABC=ACD

$$I=+BD=-ABC=-ACD((1),ac,bcd,abd)$$
 $II=+BD=+ABC=+ACD(a,c,abcd,bd)$
 $III=-BD=+ABC=-ACD(b,abc,cd,ad)$
 $IV=-BD=-ABC=+ACD(ab,bc,acd,d)$

- ■刪除Ⅰ
- 國立雲林科技大學工業工程與管理所 系統可靠度實驗室 System Reliability Lab.

■ Combined into 2⁴⁻¹

H + HI + ADC	Effect	Sets Used ,	Confounding
II + III = +ABC	A	III, IV; $x_4 = -x_2$	ABD
D = ABCD	В	$II, IV; x_4 = x_1x_2$	ABCD
	C	III, IV; $x_4 = -x_2$	BCD
AD = BCD	D AB	II, III; $x_3 = x_1x_2$ II, IV; $x_4 = x_1x_3$	ABCD BCD
	AC	III, IV; $x_4 = -x_2$	ABCD
BD = ACD	\sim AD	$II, III; x_3 = x_1x_2$	BCD
DD - 11CD	BC	$II, IV; x_4 = x_1 x_3$	ABD
CD = ABD	BD	$II, IV; x_4 = x_1 x_3$	ABC
CD – ADD	14/44	or II, III; $x_3 = x_1x_2$	ACD
	- CD	$II, III; x_3 = x_1x_2$	ABD

■ D, AD, BD, CD 被估計

■ Combined into 2⁴⁻¹

II + IV = +ACD	Effect	Sets Used ,	Confounding
	A	III, IV; $x_4 = -x_2$	ABD
B = ABCD ————	B	II, IV; $x_4 = x_1x_3$	ABCD BCD
AD = DCD	C D	III, IV; $x_4 = -x_2$ II, III; $x_3 = x_1x_2$	ABCD
AB = BCD	AB	$II, IV; x_4 = x_1x_3$	BCD ABCD
BC = ABD —	AC AD	III, IV; $x_4 = -x_2$ II, III; $x_2 = x_1x_2$	BCD
	BC	II, IV; $x_4 = x_1x_3$	ABD
BD = ABC	BD	II, IV; $x_4 = x_1x_3$ or II, III; $x_3 = x_1x_2$	ABC ACD
	CD	II, III; $x_3 = x_1x_2$	ABD

■ B, AB, BC, BD 被估計

■ Combined into 2⁴⁻¹

	Effect	Sets Used ,	Confounding
III + IV = BD		III, IV; $x_4 = -x_2$	ABD
	В	II, IV; $x_4 = x_1 x_2$	ABCD
A = ABD	C	III, IV; $x_4 = -x_2$	BCD
	D	II, III; $x_3 = x_1x_2$	ABCD
C = BCD	AB	II, IV; $x_4 = x_1x_2$	BCD
	AC	III, IV; $x_4 = -x_2$	ABCD
	AD	$\Pi, \Pi\Pi; x_1 = x_1x_2$	BCD
AC = ABCD	BC	II, IV; $x_4 = x_1x_3$	ABD
	BD	II, IV; $x_4 = x_1x_3$	ABC
		or II, III; $x_3 = x_1x_2$	ACD
	CD	$II, III; x_3 = x_1x_2$	ABD

■ A, C, AC 被估計

$$3(2^{4-2})_V //12$$

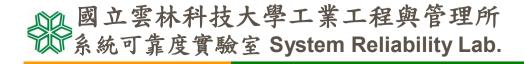
- Defined by $I = \pm BD = \pm ABC = \pm ACD$
- 實驗次數為12
- 主效應與二因子交互作用都可被估計
- ■解析度為五的設計

$$2^{5-1}V/16$$

- \blacksquare Defined by I = ABCDE
- 主效應與二因子交互作用都可被估計
- ■解析度為五的飽和 (部分因子)設計

mate is $\sigma^2/4$, and all the degrees of freedom are used for effects. We present in this section a three-quarter replicate in which all the effects are estimable with variance $3\sigma^2/16$ and which provides 8 degrees of freedom for error.

- Davies (1956) $3(2^{5-2})_{V} // 24$
- Defined by $I = \pm BCE = \pm ABCD = \pm ADE$
- \blacksquare 主效應除了E 都可被估計2次
- 二因子交互作用除了AD,BC都可被估計2次
- 解析度為五的設計 $var = \frac{3}{16}\sigma^2$



- Daniel (1958) $3(2^{5-2})_V // 24$
- Defined by $I = \pm AD = \pm BCE = \pm ABCDE$
- 主效應與二因子交互作用都可被估計2次
- 解析度為五的設計 $var = \frac{1}{4}\sigma^2$

參考文獻

- [1] Daniel, C., [1958]. On varying one factor at a time. Biometrics 14, 430-1.
- [2] Davies, O. L., [1956]. The Design and Analysis of Industrial Experiments. Oliver and Boyd, London, 472-5.
- THE END THANKS

發展

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TIME SEQUENCE FOR FACTORIAL EXPERIMENTS

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