Laboratorio

DIPOLI

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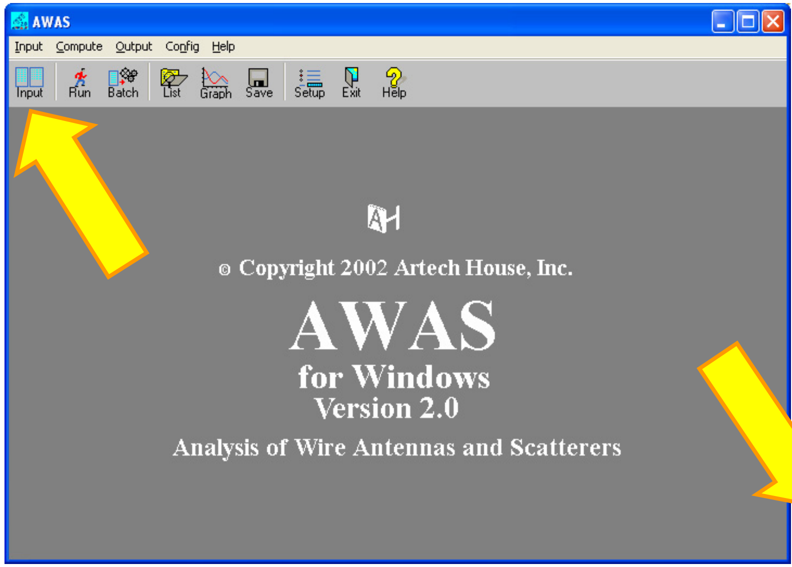

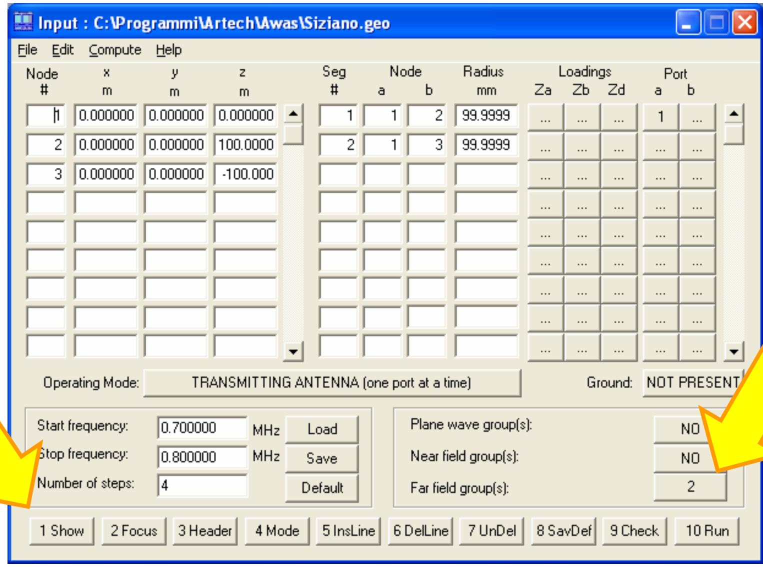

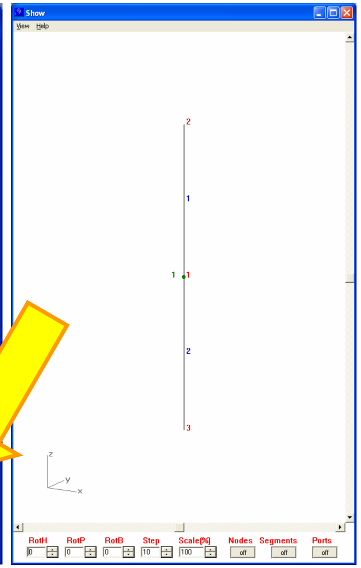

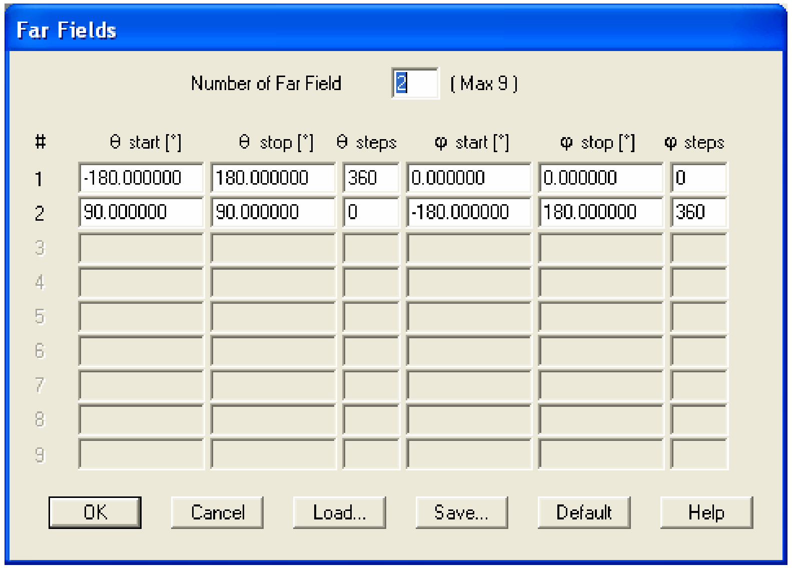

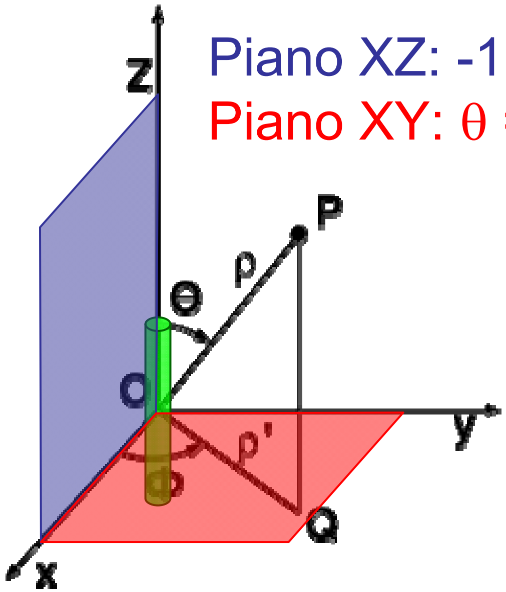

Piano XZ: -180° < θ < +180° ; φ = 0°

Piano XY: θ = 90° ; -180° < φ < +180°

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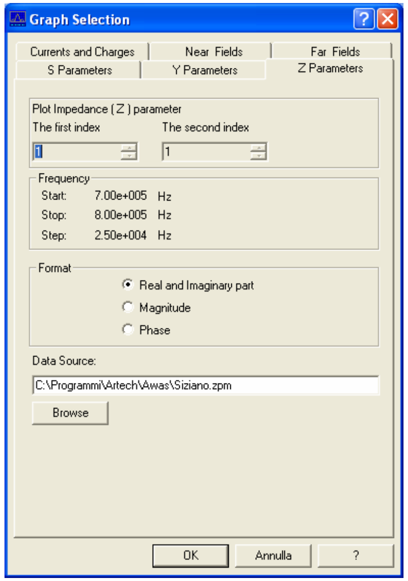

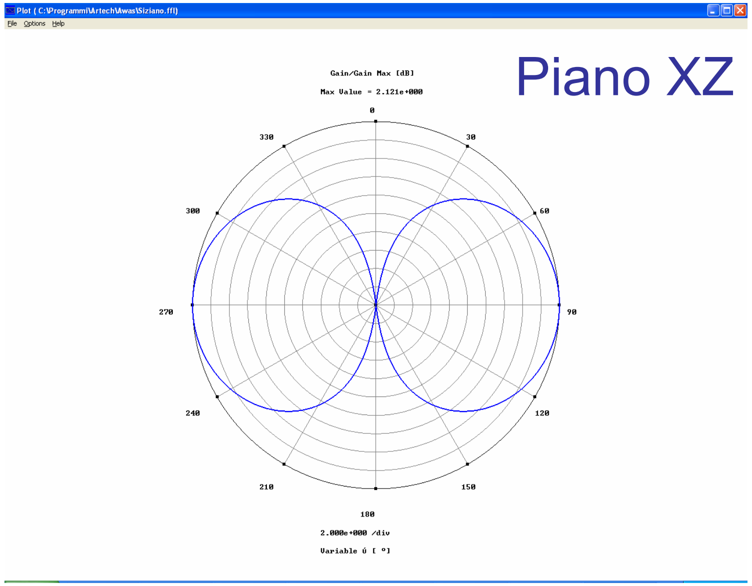

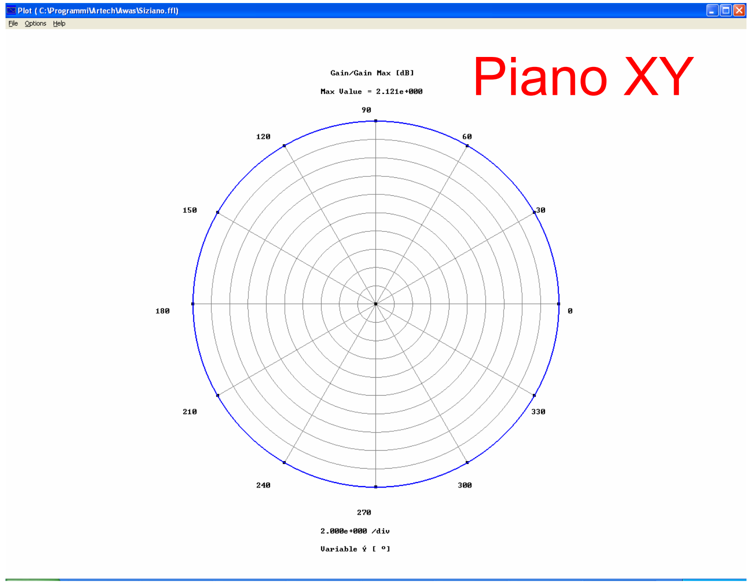

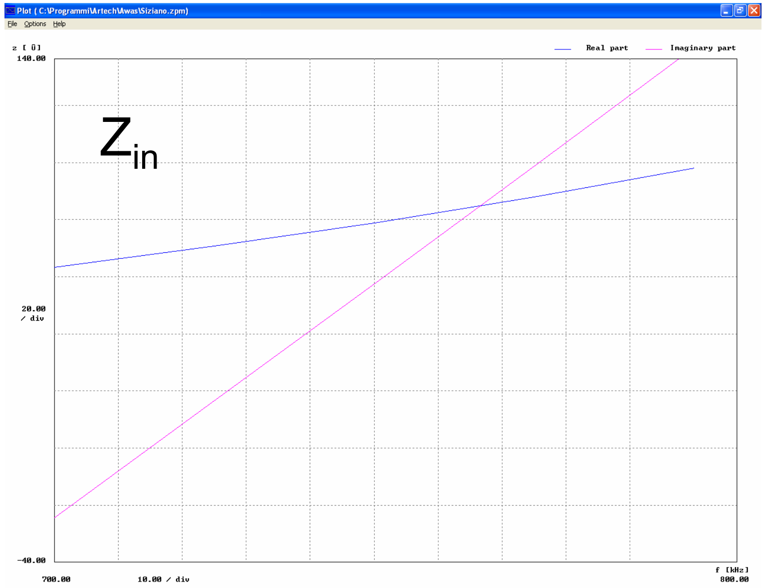

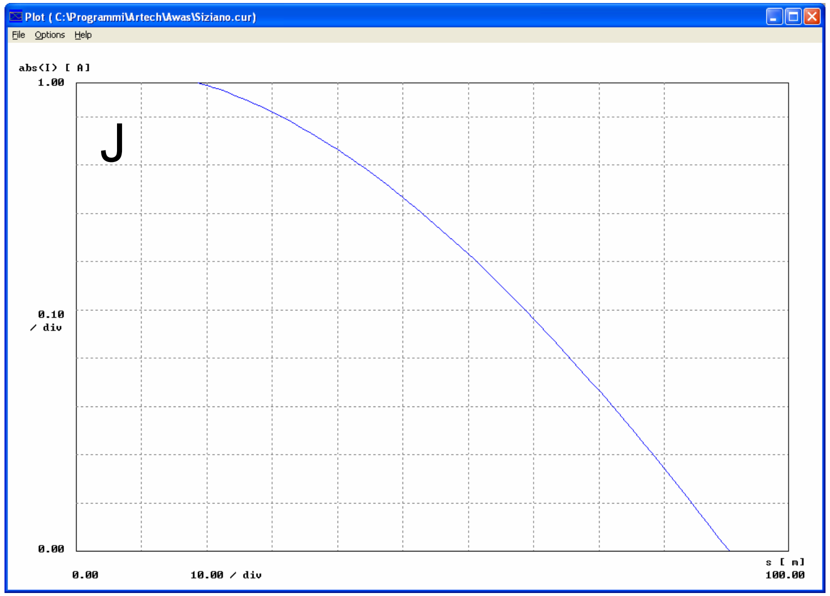

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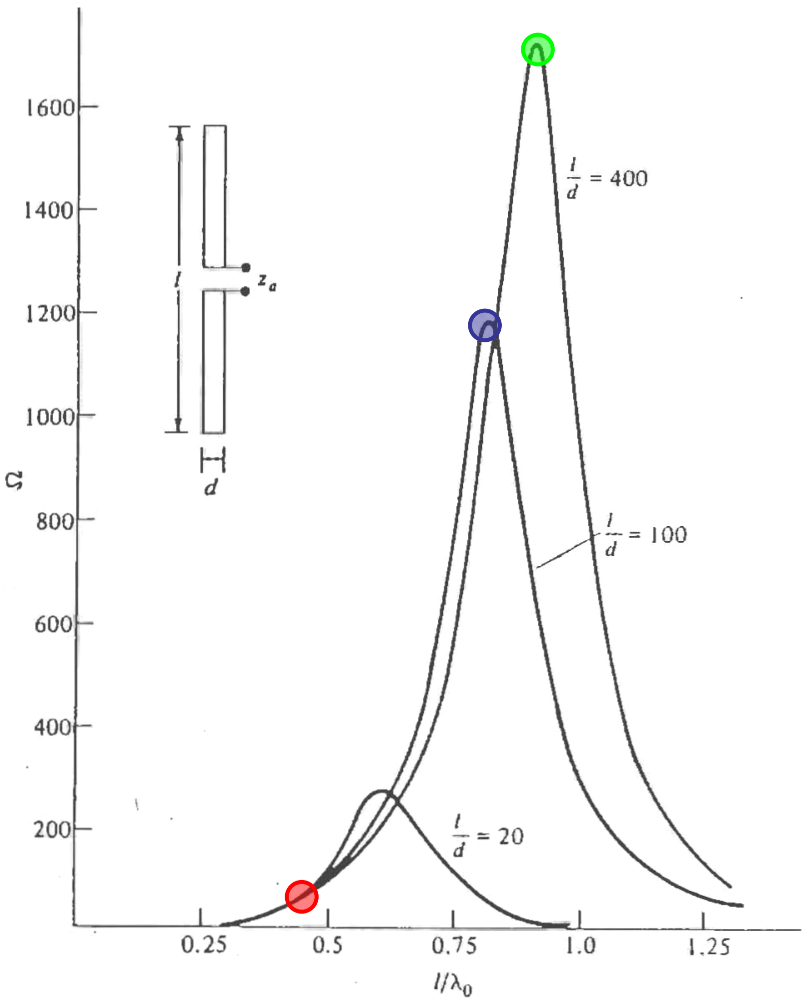
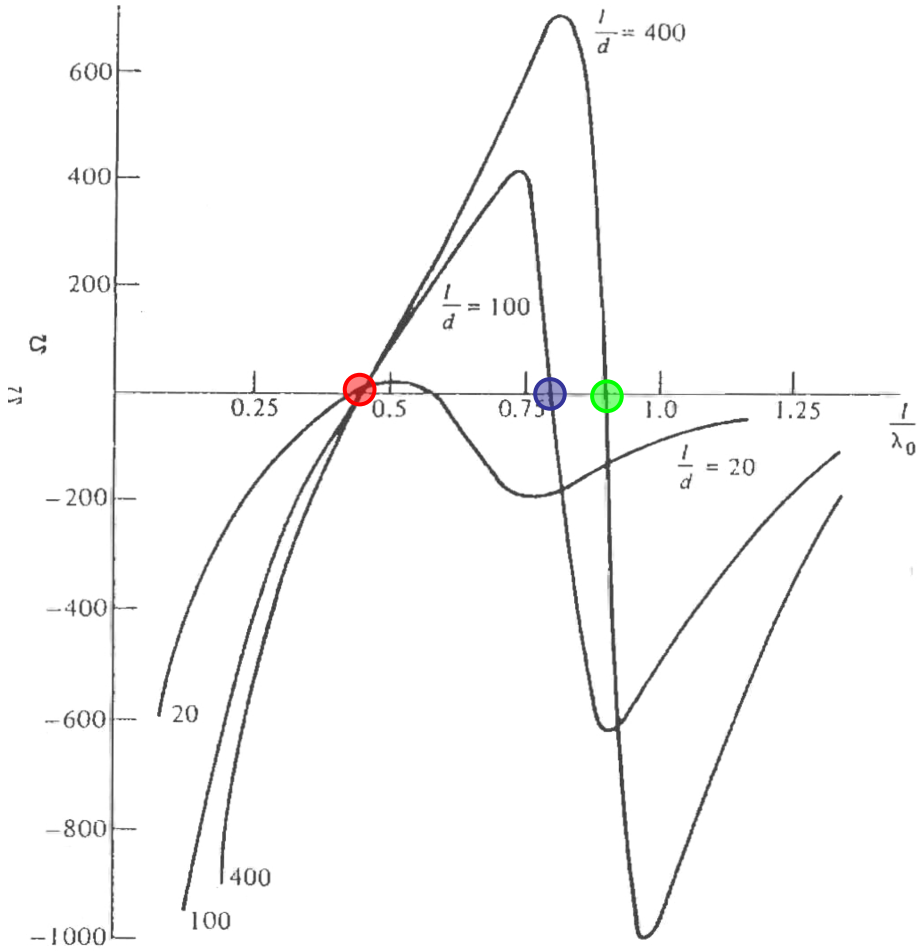
Re{Z_{in}}



Im{Z_{in}}



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Three-Dimensional Pattern Of λ/2 Dipole

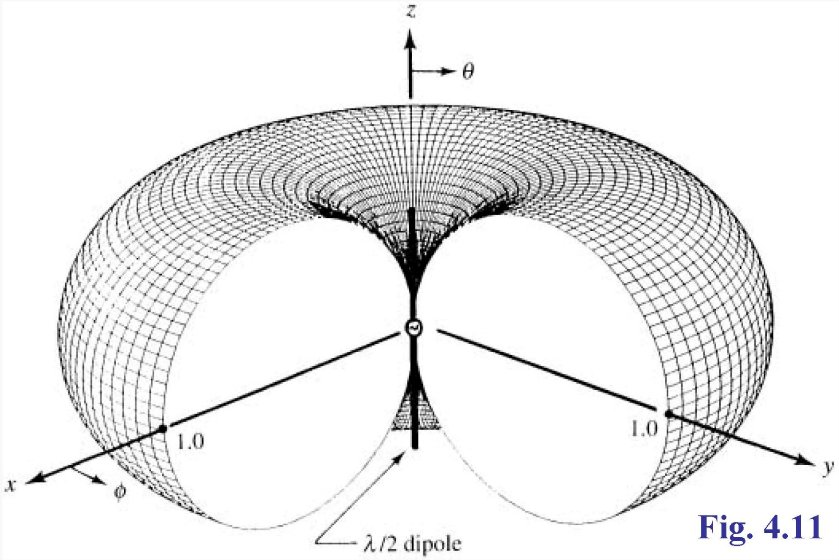

Fig. 4.11

Chapter 4
Linear Wire Antennas

Three-Dimensional Pattern (l=1.25λ)

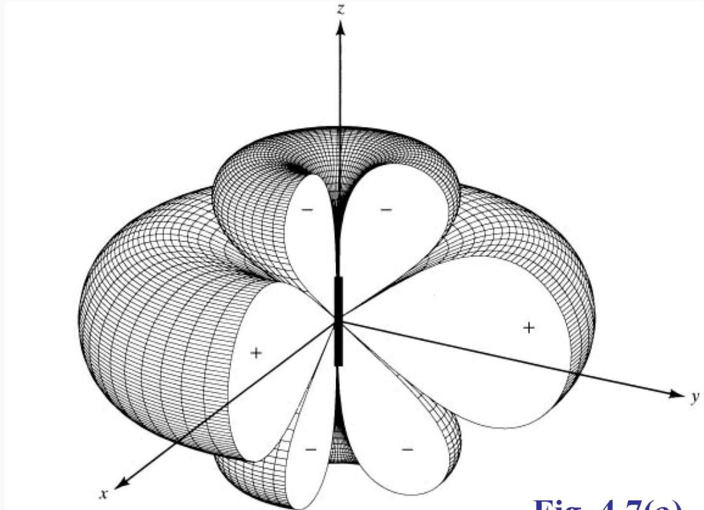

Fig. 4.7(a)

Chapter 4
Linear Wire Antennas

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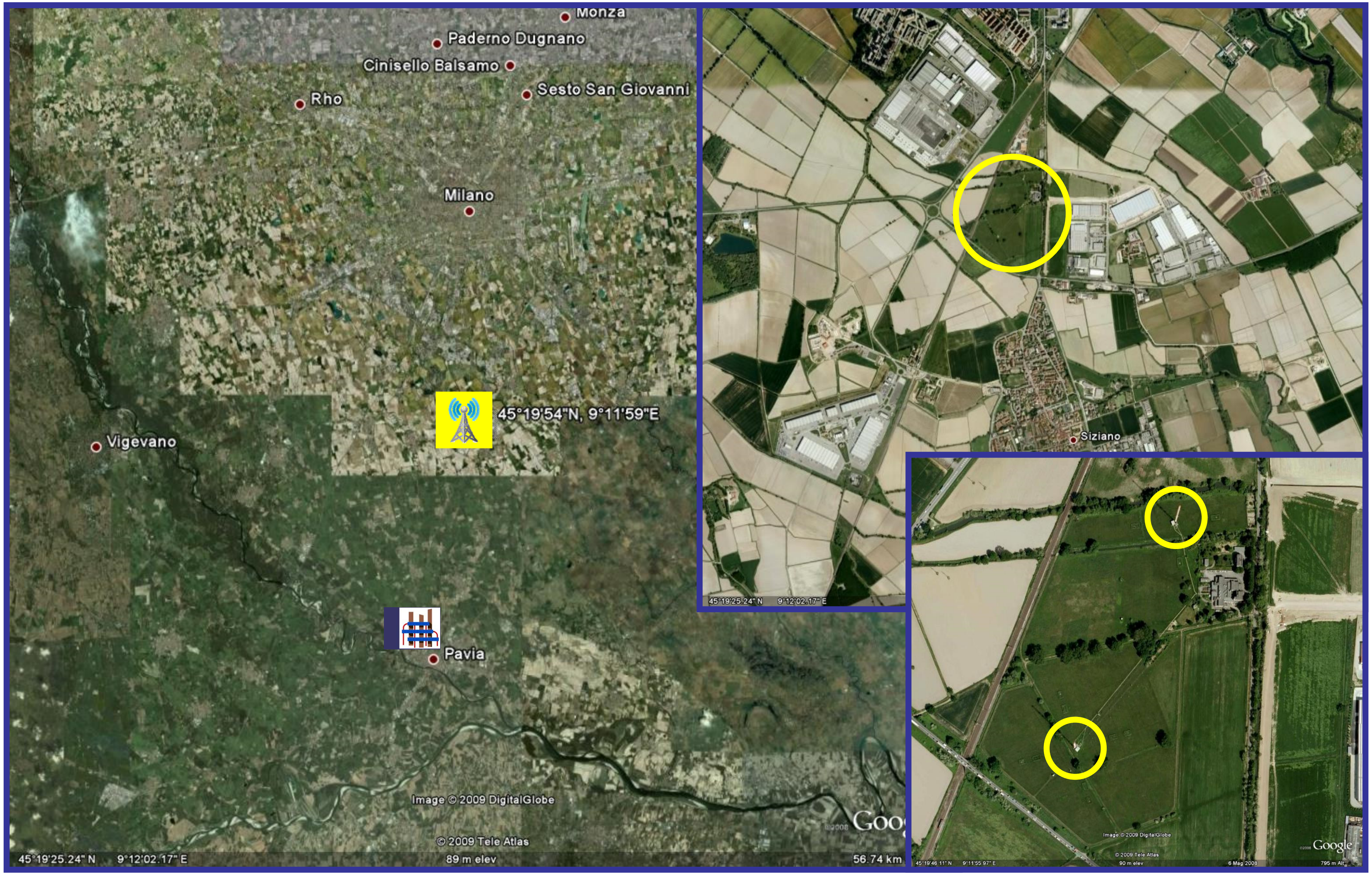

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Frequenza:	~ 700 KHz
Lunghezza d'onda:	~ 430 m
Altezza:	~ 100 m

- Trasmissioni radiofoniche RAI
- Dal 1924
- Copertura nord Italia

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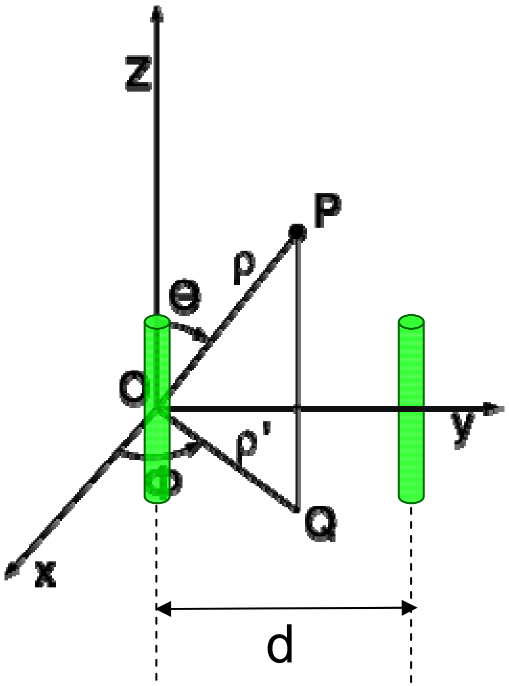

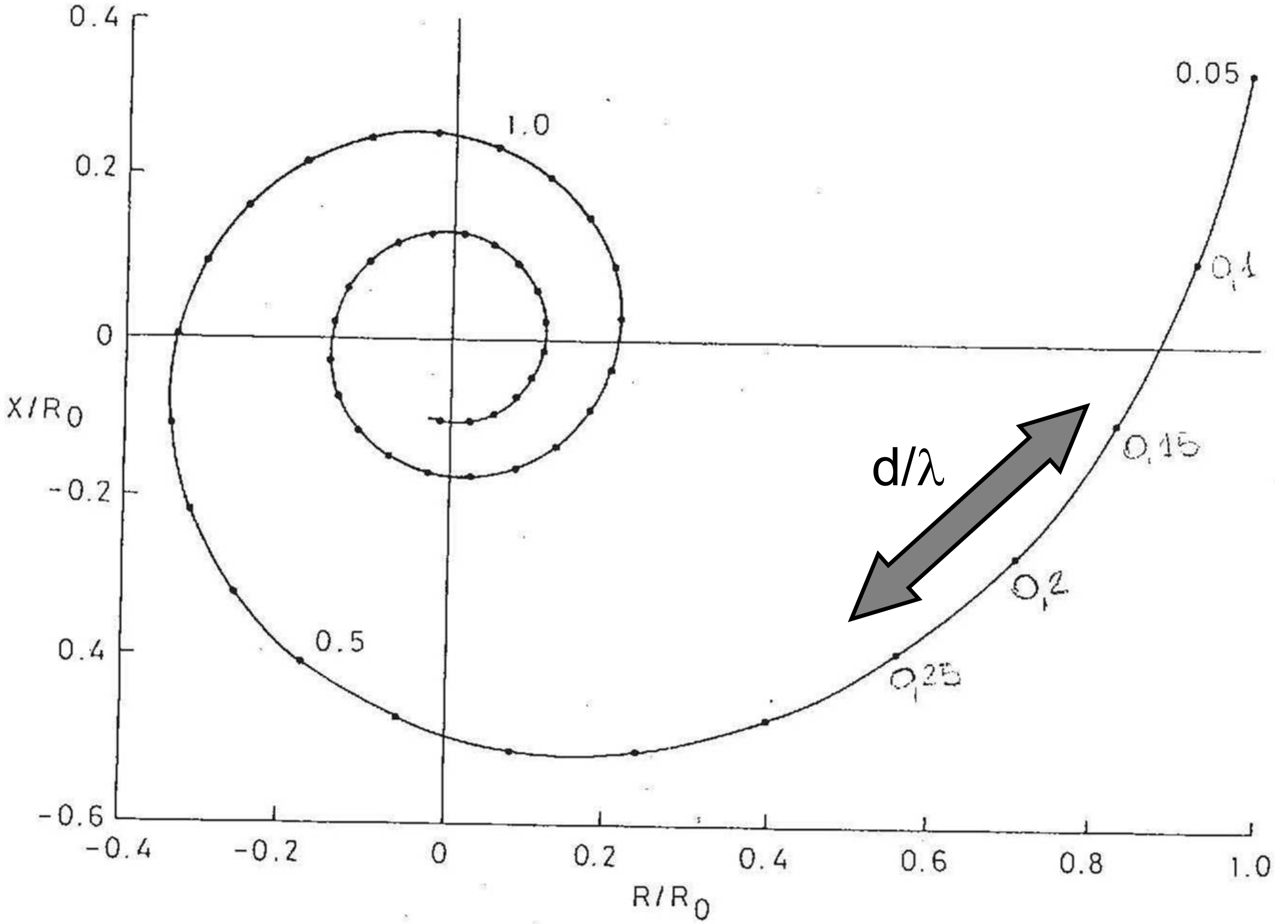

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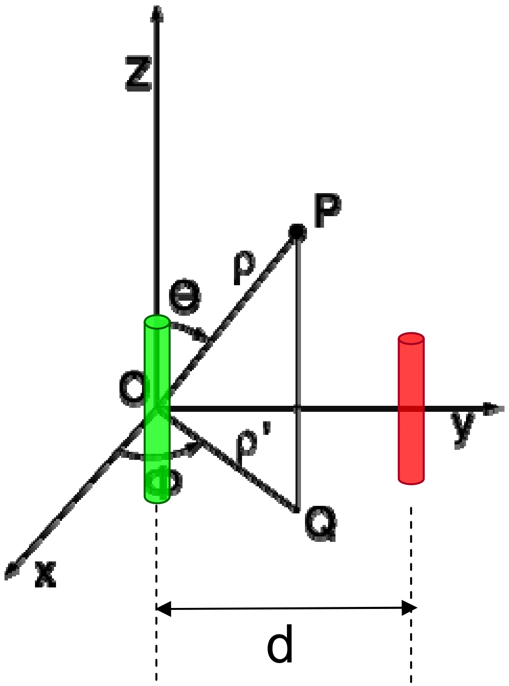

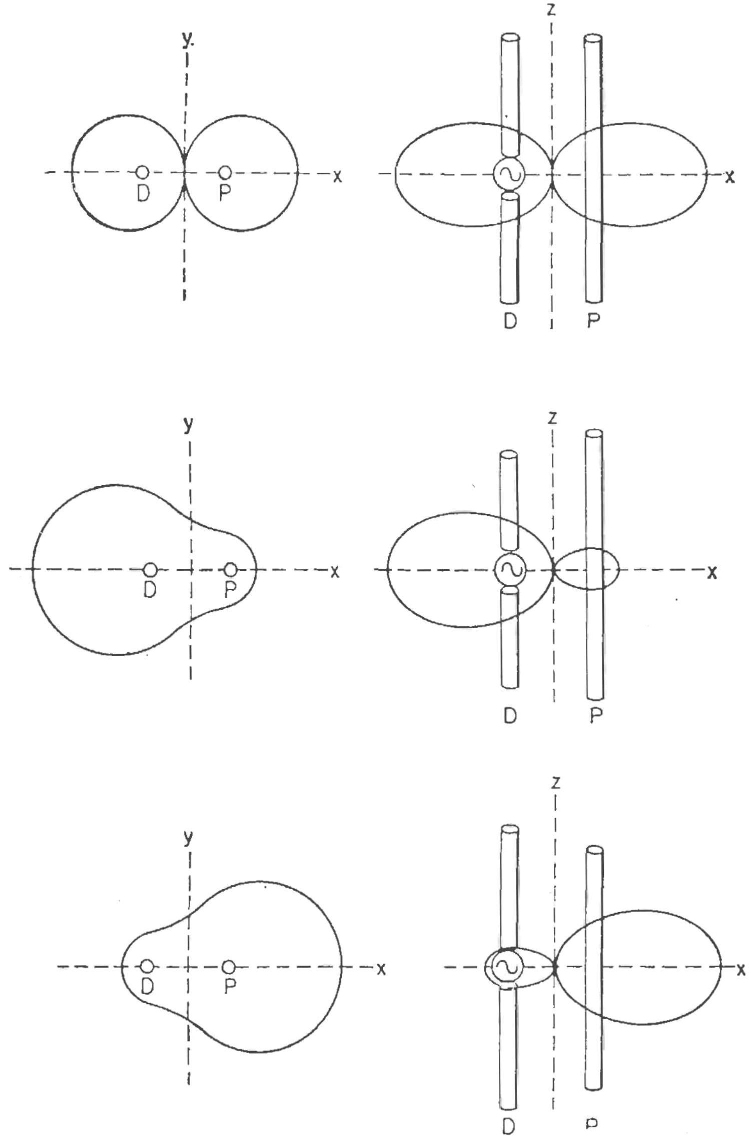

ESERCITAZIONE – DIPOLI

Università di Pavia

San Gimignano

prof. Yagi

Frequenza: ~ 50 MHz
Lunghezza d’onda: ~ 6 m

- Trasmissioni televisive RAI

ESERCITAZIONE – DIPOLI

Università di Pavia

Uda, 1927

短波長ビームに就て（第九報告）

（反射器並にデイレクターの空中線に及ぼす影響）

會員　宇　田　新　太　郎

（東北帝國大學工學部電氣工學科）

On the Wireless Beam of Short Electric Waves. (IX)

(The Effects of Wave Reflector and Director on Sending Antenna.)

By S. UDA, Member.

(Tohoku Imperial University)

内　容　梗　概

一般に反射器又はデイレクターが空中線電流或は電力に及ぼす影響に就て研究した結果の報告である。最初に理論上の解式を導き、次に之に依つて計算した結果と、實驗結果を比較してある。かくして反射器又はデイレクターの空中線よりの距離や或は其長さに依つて、空中線電流なり電力が如何なる影響を受けるかを明かにしてある。

Abstract.

The effects of wave reflector and director on sending antenna circuit are theoretically studied with special reference to the following points:

1. Effect on antenna current.
2. Effect on antenna power.
3. Wave reflector and director characteristics at constant antenna current and power.
4. Directive polar diagrams at constant antenna current and power.

Some experimental results are also shown and compared with the calculated one.

〔I〕緒　　言

短電波ビームを得べく、空中線の近くに排列される反射器並にデイレクターが、空中線電流或は電力に如何なる影響を與へるかを知るは極めて大切な事である。これに關して、拙著短波長ビームに就ての第四報告* の第五節に、"空中線電力に及ぼす反射器の影響" と題して、特種の場

本編記載の研究は財團法人齋藤報恩會より研究費の補助を受け、東北帝國大學内に於て之を行つたものである。

* 電氣學會雜誌　第四百六十二號（昭和二年一月）

Yagi, 1928

BEAM TRANSMISSION OF ULTRA SHORT WAVES*

By

Hidetsugu Yagi

(College of Engineering, Tohoku Imperial University, Sendai, Japan)

Summary—*Part I of this paper is devoted to a description of various experiments performed at wavelengths below 200 cm. Curves are given to show the effect of the earth and various types of inductively excited antennas called "wave directors." Part I is concluded with a discussion of beam and horizontally polarized radiation.*

Part II is devoted chiefly to the magnetron tubes used for the production of very short wavelengths (as low as 12 cm.) and the circuit arrangements employed. It is shown that the geometry of the tube and its external connections are of great importance.

The effect of variation of plate voltage, magnetic field strength and other factors on the high-frequency output, is described.

Introduction

THE general term "short wave" loses much of its lucidness when the range of frequency involved is considered. For this reason, the term "ultra short waves" will apply to only those electro-magnetic waves whose length is less than ten meters.

One of the simplest ways of generating short waves by means of vacuum tubes is to use the push-pull circuit developed by M. Mesny. This connection has been fully described by Mr. Englund in the Proceedings of the Institute.

Waves shorter than ten meters may be produced with stability, but it is difficult to make ordinary tubes operate satisfactorily below two meters. While electro-magnetic coupling is successfully used in the method referred to above, it seems much better to resort to electrostatic coupling in circuits used for the generation of waves of the length described in this paper. Fig. 1 shows a circuit which has been used in the generation of waves shorter than 100 cm.

Stable oscillations were successfully produced using ordinary tubes in this circuit. Such waves have been utilized to determine the natural frequencies of the various forms of metallic bodies. The characteristics of "wave directors", which will be fully described later in the paper, were thoroughly studied with the short waves produced using this type of generator. However, it was

* Original Manuscript Received by the Institute, January 30, 1928; Revised Manuscript Received by the Institute, March 29, 1928. Presented before meetings of the Institute in New York, Washington and Hartford.

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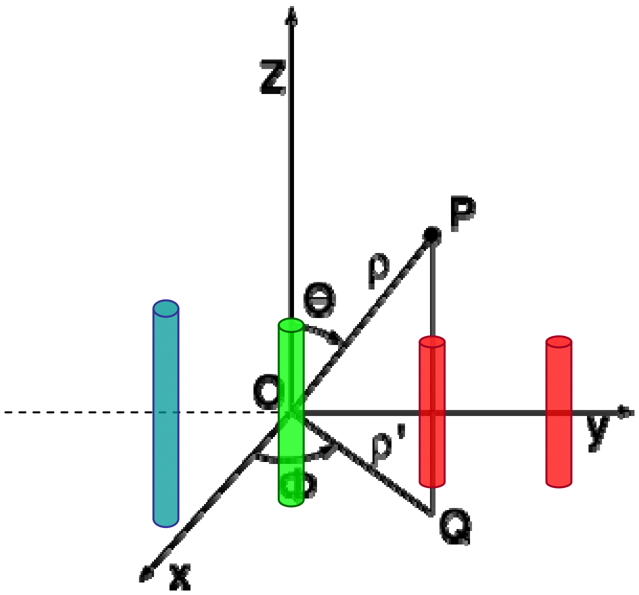

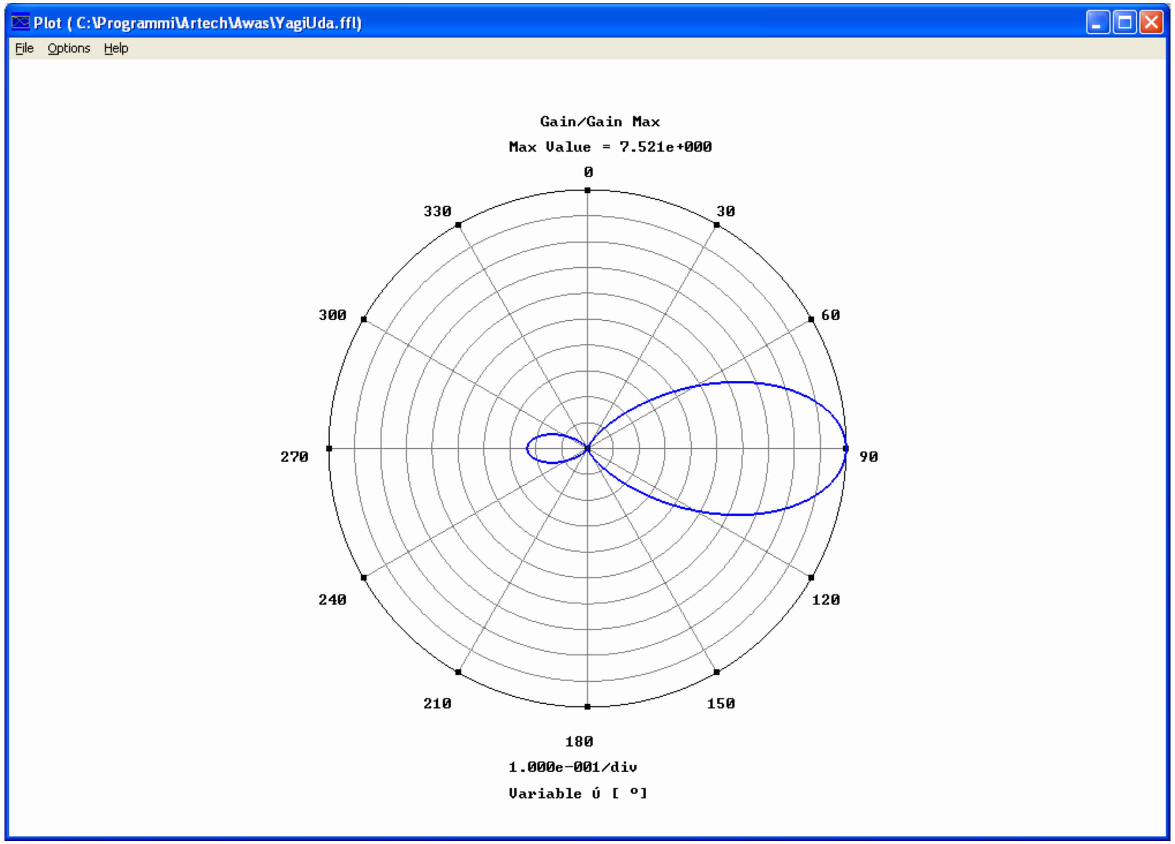

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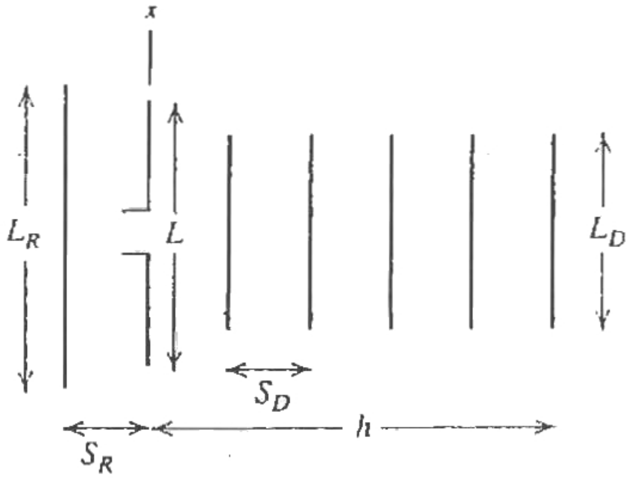

Table 5-4 Optimized Lengths of Parasitic Dipoles for Yagi–Uda Array Antennas of Six Different Boom Lengths

$d/\lambda = 0.0085$	Boom length of Yagi–Uda Array, λ					
$S_R = 0.2\lambda$	0.4	0.8	1.20	2.2	3.2	4.2
Length of reflector, L_R/λ	0.482	0.482	0.482	0.482	0.482	0.475
Length of director D_n, (L_{D_n}/λ) D_1	0.442	0.428	0.428	0.432	0.428	0.424
D_2		0.424	0.420	0.415	0.420	0.424
D_3		0.428	0.420	0.407	0.407	0.420
D_4			0.428	0.398	0.398	0.407
D_5				0.390	0.394	0.403
D_6				0.390	0.390	0.398
D_7				0.390	0.386	0.394
D_8				0.390	0.386	0.390
D_9				0.398	0.386	0.390
D_{10}				0.407	0.386	0.390
D_{11}					0.386	0.390
D_{12}					0.386	0.390
D_{13}					0.386	0.390
D_{14}					0.386	
D_{15}					0.386	
Spacing between directors (S_D/λ)	0.20	0.20	0.25	0.20	0.20	0.308
Gain relative to half-wave dipole, dBd	7.1	9.2	10.2	12.25	13.4	14.2
Design curve (Fig. 5-37)	(*A*)	(*C*)	(*C*)	(*B*)	(*C*)	(*D*)
Front-to-back ratio, dB	8	15	19	23	22	20

Source: P. P. Viezbicke, "Yagi Antenna Design," NBS Tech. Note 688, National Bureau of Standards, Washington, DC, Dec. 1968.