Analysis of the Training Method for the Time-of-Time of the Movement Based on the Wireless

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Abstract. In order to improve the effective ability of sports, it is necessary to carry out sports timing training, construct the wireless communication network of sports timing training, and propose a sports timing training method based on wireless communication. A training model of motion timing in wireless communication network based on spatial interval equilibrium regulation and piecewise load distribution is constructed. The wireless communication transmission channel model of motion timing training is constructed, the channel adaptive equilibrium allocation of motion timing training in wireless communication network is carried out by using spatial equilibrium scheduling method, the orthogonal matching signal tracking model of motion timing training is established. Combined with the load block equilibrium allocation method of multiplex motion timing training, the optimal allocation of motion timing training is carried out. the effectiveness of motion timing training information transmission in wireless communication network is characterized by the number of endpoint paths, and the anti-interference ability of communication is improved by combining the interference suppression method of training environment. The simulation results show that the output quality of motion timing training in wireless communication network is high and the bit error rate (BER) is low, which improves the balanced distribution ability of motion timing training load in wireless communication network.

Keywords: Wireless communication · Sports · Interval timing training · Physical training

1 Introduction

In recent years, people's disposable income is getting more and more, so people pay more attention to education, so the demand for education is getting higher and higher. In order to meet the needs of the current education, our country is constantly carrying out the education reform, and it is necessary to do all the students for the students [1]. The physical exercise in our country is very hot, but in the case of track and field training, the overall training level is not high, the professional is deficient, and the degree of attention and importance of the training is also low. So that most people are less aware of the track and field movement, so that the enthusiasm of the track and field training learning is not high, and further, the overall level of the track and field

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movement is getting worse. The physical education is not only to improve its physical skills, to master the fitness of the training, but also to train according to the health status of the students [2]. The physical education teachers can't train the students too much during the training, too much training is to make the physical organization of the students hurt easily, and if the injury is serious, the students can have sequela. Second, too many training often leads to the physical ability of the students to be subjected to severe load, not only cannot achieve the purpose of physical exercise, but also cause harm to the body, so that the nervous system of the students is tired, the students can also produce the psychological state of the exclusion of the track and field training, and the sports level is difficult to improve [3]. The teacher should use all kinds of teaching tools correctly, can refer to other teaching videos or teacher training, and can absorb and draw on the training teaching of the sports course from all aspects. On the one hand, we need to train the students, which is the foundation, followed by the next step of speed and skill training. Carry out the content training for students to imitate the professional competition system, strengthen the further understanding of the teaching content, and carry out strictly according to the standard. The perfect system is an important guarantee for the smooth progress of the track and field training, so the school should pay attention to the sound of the related training system. When the students are in track and field training, the school should adjust the time of the students' cultural lesson and the track and field training, so as to avoid the interruption of the training of the students or the failure of the culture class due to the time conflict. In addition, the school should develop the relevant training plan according to the specific situation of the student's training, so as to urge the students and the teachers to carry out the training strictly [4].

The information enhancement model for transmitting the timing training data of the moving sub-period under the wireless communication network is constructed, the anti-interference capability of the time-counting training data of the moving sub-period under the wireless communication network is improved by the information enhancement, and a mathematical model of the timing and training of the moving sub-period under the wireless communication network is constructed, the channel balance configuration model for timing and training of the moving sub-period under the wireless communication network is established, and the adaptive link forwarding control method is adopted to carry out the channel equalization design of the time-division timing training of the moving sub-period under the wireless communication network, in order to improve the balance of the timing and training of the moving sub-period under the wireless communication network, the relevant wireless communication network is subject to great attention to the research of the mathematical modeling of the time-division timing training of the moving sub-period under the related wireless communication network. In this paper, a mathematical modeling method for the time-of-time training in a wireless communication network based on space-space-space-balancing and segment-load allocation is presented. firstly, the channel equalization model is designed, and then the output anti-interference design of the time-division timing training of the moving sub-period under the wireless communication network is carried out, and finally carrying out experimental test and analysis to obtain the validity conclusion [5].

2 The Time-Time Communication Channel Model and the Self-adaptive Equalization Configuration of the Motion Time-Division Period

2.1 Motion Separation Period Timing Communication Channel Model of the Exercise Time-Division Timing Training Load Communication

In order to realize the mathematical modeling of motion timing training in wireless communication network, firstly, the channel equilibrium allocation model of motion timing training in wireless communication network is constructed, and the channel balanced transmission scheduling is carried out combined with the optimal allocation of moving timing training resources in wireless communication network, and the information sampling model of motion timing training in wireless communication network is established [6]. The adaptive channel equalization design method is used to equalize the multiplex resources, and the iterative search method is used to optimize the allocation of the transmission link. It is assumed that the transmission node of the motion timing training in the wireless communication network is composed of t tap nodes. Under the wireless communication network, the output characteristic quantity of the channel n of the s relay point is analyzed, and the transmission channel model design of the motion timing training is realized. Assuming that the tap sampling interval of motion timing training symbols in wireless communication network is $N = 2P$, where MT/N and N are integers, and A, the spatial link structure combination model of motion timing training is established under wireless communication network, and the optimal channel transmission symbol interval distribution combination is found by iterating, assuming that the spatial distance of symbol transmission is d, the output model of motion timing training symbol in wireless communication network is as follows:

$$x_m(t) = \sum_{i=1}^{I} s_i(t)e^{j\varphi_{mi}} + n_m(t),\ -p+1 \le m \le p \tag{1}$$

Wherein, $s_i(t)$ is the multi-path component of the motion timing training transmission node in the wireless communication network, and $x_m(t)$ is the spectrum characteristic received by the basic matrix element m of the motion timing training in the wireless communication network [7]. The channel gain model of the motion timing training in the wireless communication network environment is given as follows:

$$h(t) = \sum_{i} a_i(t)e^{j\theta_i(t)}\delta(t - iT_S) \tag{2}$$

In the above formula, $\theta_i(t)$ represents the spatial spectrum distribution components of motion timing training in wireless communication network environment. In the second subslot, the time sampling length of motion timing training is G, then taking baud rate as modulation component, the impulse response feature reconstruction model of motion timing training in wireless communication network environment is established, which is expressed as follows:

$$x(t) = [x_{-P+1}(t), x_{-P+2}(t), \cdots, x_P(t)]^T_{N\times 1} \tag{3}$$

$$s(t) = [s_1(t), s_2(t), \cdots s_I(t)]^T_{I\times 1} \tag{4}$$

According to the Shannon formula, the dynamic migration model of symbol sequence for motion timing training in wireless communication network is established. In the multi-path spread channel, the balance between the communication link channel differences is tested [8–10], and the channel load transmission model is expressed as follows:

$$c(\tau, t) = \sum_n a_n(t)e^{-j2\pi f_c \tau_n(t)}\delta(t - \tau_n(t)) \tag{5}$$

In which, $a_n(t)$ is an extension loss of the timing training of a wireless communication network in a wireless communication network in the n-th path, and $\tau_n(t)$ is an n-th communication channel output experiment, thereby constructing a transmission channel model of the time-time training of the moving sub-period under the wireless communication network, and obtaining the self-adaptive learning function as follows:

$$\begin{cases} \min \sum\limits_{1\le i\le K} \sum\limits_{e\subseteq k(e)} \frac{f(e(i))}{C(e,i)} \\ 0 \le f(e,i) \le C(e,i) \\ F = const \\ \sum\limits_{1\le i\le K, e\subseteq k(e)} \frac{f(e(i))}{C(e,i)} + \sum\limits_{e\subseteq k(e)} \frac{f(e'(i))}{C(e',i)} \le k(v) \end{cases} \tag{6}$$

Based on the improved motion weight analysis method, a frequency spectrum response characteristic separation method is adopted in the multi-path channel, and a channel model for timing and training of the motion sub-period under the wireless communication network is constructed [11].

2.2 Channel Adaptive Equalization Configuration

The channel adaptive Equalization configuration of motion timing training in wireless communication network is carried out by using spatial equilibrium scheduling method, and the orthogonal matching signal tracking model of motion timing training is established [12]. In wireless communication network, the random link model of motion timing training is represented as follows:

$$x(t) = As(t)r_i + n(t)\theta_i \tag{7}$$

In the above formula, r_i, θ_i are the tangent spectrum width and phase characteristics of motion timing training signal in wireless communication network. Based on the method of communication network topology and path effectiveness analysis, the spatial spectral density of motion timing training is analyzed, and the statistical characteristic $R_{MDMMA}(k)$ is satisfied.

$$abs[|z(k)|^2 - R_{MDMMA}(k)] = \min_i abs[|z(k)|^2 - R_{MDMMA\_i}] \tag{8}$$

Based on the adaptive allocation method of resource transmission path, the scattering structure model of motion timing training in wireless communication network is established. The transmission bit error rate estimation error $e(n)$, motion timing training signal and noise energy correlation factor of motion timing training in wireless communication network are obtained [13], and the cross-correlation function representation of multi-hop path resource transmission is calculated as:

$$C_{T'}(f) = \sum_{k=-K}^{K} c_k e^{-j2\pi fkT'} \tag{9}$$

Where, c_k is the resource modulation coefficient between the feedforward path nodes, N is the attenuation factor of the motion time-by-time timing training signal, and P represents the training environment interference intensity of the motion time-by-time timing training under the wireless communication network, $T' = MT/N$. Under the signal normalization processing, the validity of transmission is characterized by the number of endpoint paths, and the symbol rate of network transmission is T_a and the symbol width is $T_a = 1/R_a$. According to the above analysis, the adaptive equalization configuration model of channel is constructed as follows:

$$\mathrm{sgn}(z_R^2(k) - R_{MDMMA\_R}) = \mathrm{sgn}(z_R^2(k) - \hat{e}_R^2(k)) \tag{10}$$

$$\mathrm{sgn}(z_I^2(k) - R_{MDMMA\_I}) = \mathrm{sgn}(z_I^2(k) - \hat{e}_I^2(k)) \tag{11}$$

Wherein, $\hat{e}_R^2(k)$ represents the delay estimation value of multi-hop path resource transmission, $z_R^2(k)$ is reverberation ratio, $z_I^2(k)$ is the carrier frequency characteristic of motion timing training in wireless communication network, and $\hat{e}_I^2(k)$ is time delay estimation. According to the above analysis, the channel adaptive equilibrium configuration model is constructed [14].

3 Optimization of Motion Timing Training in Wireless Communication Network

3.1 Load Block Balance Allocation for Multi-multiplex Motion Time-Division Timing Training

On the basis of constructing the wireless communication transmission channel model of motion timing training, and using the spatial equilibrium scheduling method to configure the channel adaptive Equalization of motion timing training under wireless communication network, the mathematical modeling of motion timing training in wireless communication network is carried out, and the conjugated characteristic solution of multi-hop path resource transmission for motion timing training in wireless communication network is obtained as:

$$d(t) = a(t)c(t) = \sum_{n=0}^{\infty} d_n g_c(t - nT_c) \tag{12}$$

Wherein

$$d_n = \begin{cases} +1 & a_n = c_n \\ -1 & a_n \neq c_n \end{cases} \ (n-1)T_c \leq t \leq nT_c \tag{13}$$

The channel equilibrium scheduling model of motion timing training in wireless communication network is constructed by using multi-frequency carrier loading method [15]. The error function of channel decision feedback equalization control for motion timing training in wireless communication network is obtained by using singular value decomposition (SVD) method:

$$\begin{aligned} \hat{e}(k) = z_R(k)(\left|z_R(k)\right|^2 - \hat{s}_R^2(k)) \\ + jz_I(k)(\left|z_I(k)\right|^2 - \hat{s}_I^2(k)) \end{aligned} \tag{14}$$

The effectiveness of motion timing training information transmission in wireless communication network is characterized by the number of endpoint paths, and the carrier frequency is fixed [16]. The interference suppression of $c'(t)$, channel output is obtained by decision feedback spread spectrum sequence of motion timing training receiver in wireless communication network, and the feedback matching filter output is obtained as:

$$\begin{aligned} J_{MMDMMA\_R} = c'(t).E[(z_R^2(k) - R_{MDMMA\_R}(k))^2] \cdot \rho(k) \\ + \ [1 - \rho(k)] \cdot E[(z_R^2(k) - R_R)^2] \end{aligned} \tag{15}$$

According to the above analysis, the channel resource allocation model of motion timing training in wireless communication network is extracted, and the delay error is as follows:

$$e(k) = z(k)[|z(k)|^2 - R] \tag{16}$$

3.2 Interference Suppression and Output Optimization of Timing Training in Different Periods of Motion

Interference suppression is performed according to the channel difference of communication link, and communication filtering is carried out according to the training environment interference suppression method to improve the anti-interference of communication:

$$\begin{aligned} f_F(k+1) &= f_F(k) - \mu \cdot \nabla_{f_F(k)} J_{MMDMMA} \\ &= f_F(k) - \mu_F[\rho(k) e_{MDMMA\_R}(k) + (1-\rho(k)) e(k)] y^*(k) \end{aligned} \tag{17}$$

The direct sequence spread spectrum processing of the output channel is carried out on the basis of the energy efficiency of the system as a target function [17]. The channel gain on the communication link of the system is calculated, and the direct sequence spread spectrum carrier frequency component of the timing training of the motion sub-period under the wireless communication network is obtained as follows:

$$\boldsymbol{y}(k) = \boldsymbol{a}(k)\boldsymbol{h}(k) + \boldsymbol{n}(k) \tag{18}$$

Wherein, $\boldsymbol{n}(k)$ is the channel gain component, $\boldsymbol{h}(k)$ is the estimated delay on the H transmission channel, and $\boldsymbol{a}(k)$ is the frequency domain filter modulation component. The channel state information of each moving timing communication link is obtained, and the SNR is obtained as:

$$J_{MDMMA} = \rho \cdot E[(|z(k)|^2 - R_{MDMMA}(k))^2] \tag{19}$$

From the point of view of resource transmission, the similarity between nodes in moving interval wireless communication network is reportrayed, and the validity analysis model of transmission path between two moving timing nodes is obtained as follows:

$$\boldsymbol{f}(k+1) = \boldsymbol{f}(k) - \mu \cdot \rho \cdot e_{MDMMA}(k) \boldsymbol{y}^*(k) \tag{20}$$

Wherein:

$$e_{MDMMA}(k) = z(k)[|z(k)|^2 - R_{MDMMA}(k)] \tag{21}$$

The output iterative error of motion timing training load communication is as follows:

$$p_{ri}(t) = p(t) * h_i(t) + n_{pi}(t) \tag{22}$$

In the formula, $h_i(t)$ is the impulse response function of the communication channel of the motion timing training load in $p(t)$. In order to realize the optimization of the balanced allocation of the motion timing training channel in the wireless communication network, the impulse response function of the communication channel of the motion timing training load in G is analyzed [18–20].

4 Simulation Test Analysis

In order to verify the effect of the proposed method, several different types of wireless communication network networking environments are selected for mathematical modeling of motion timing training. The experiment is based on Matlab. The number of nodes in the wireless communication network motion timing training load communication is set to be 200, the data aggregation coefficient is 0.693, the sampling frequency of the modulation sequence is 12 kHz, the carrier frequency is 14.8 kHz, and the number of adaptive equilibrium iterative steps is 1200. The convergence step of exercise timing training is 50, and the characteristic parameters of communication data transmission of exercise timing training load are shown in Table 1.

Table 1. Distribution of characteristic parameters

Sports timing training network	Star network	Tree network	Loop network
Node number	132	158	214
Number of edges	54	21	12
Carrier coefficients	0.13	0.35	0.10
Weight	0.15	0.29	0.29

According to the above parameter setting, the modeling and analysis of motion timing training in wireless communication network is carried out, and the signal-to-noise ratio (SNR) of training environment interference is set to −12 dB–0 dB, and the input signal is shown in Fig. 2.

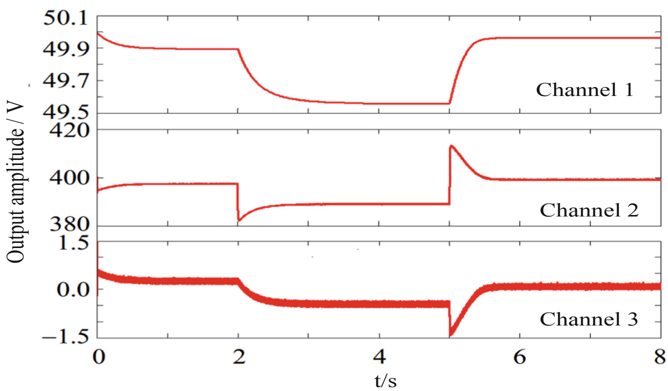

Fig. 1. Input signal of motion timing training in wireless communication network

Taking the signal of Fig. 1 as the test sample, the channel gain on the communication link of the system is calculated, and the optimal allocation of motion timing training load is carried out by combining the multi-reuse motion timing training load block equilibrium allocation method. The decision feedback equalizer is used to equalize the motion timing training channel allocation process in the wireless communication network, and the communication output is shown in Fig. 2.

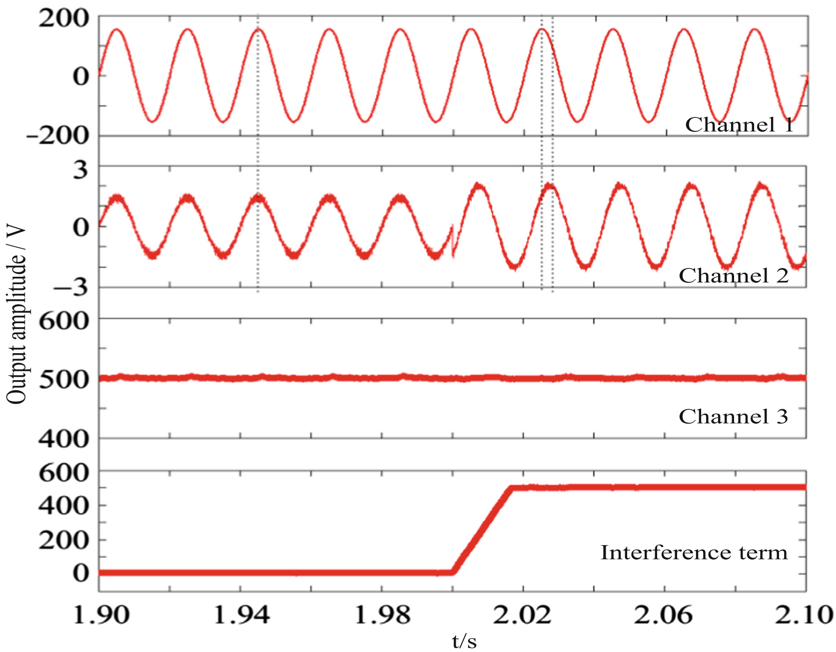

Fig. 2. Output of timing training in different periods of time

The analysis of Fig. 2 shows that the proposed method can effectively realize the channel equalization and resource optimal allocation of motion timing training in wireless communication networks, and the output balance is good. The output bit error rate (BER) of motion timing training in wireless communication network is tested by different methods. The comparison results are shown in Table 2.

Table 2. Output error bit rate comparison

Input signal to noise ratio/dB	Proposed method	Reference [3]	Reference [4]
−12	0.024	0.165	0.198
−8	0.011	0.076	0.165
−4	0	0.056	0.113
0	0	0.032	0.065

The analysis Table 2 shows that the output quality of motion timing training in wireless communication network is higher, the BER is low, and the balanced distribution ability of exercise timing training load is improved.

5 Conclusions

In a wireless communication network movement sub-period timing training environment, an information enhancement model of a time-time training data transmission of a movement sub-period in a wireless communication network is constructed. The channel equalization design and the motion time-division timing training mathematical modeling of the time-division timing training of the moving sub-period under the wireless communication network are carried out. the invention discloses a scattering structure model for timing training of a motion time-division period under a wireless communication network, a multi-frequency carrier loading method is adopted, a channel balance scheduling model for timing training of a motion time-division period under a wireless communication network is constructed, the direct sequence spread spectrum processing of the output channel is carried out with the energy efficiency of the system as a target function, the channel gain on the communication link of the system is calculated, And realizes the optimization of the data transmission of the timing training of the motion separation period. The results show that the quality of the communication is high, the balance is good, the error is low, and the communication quality is improved. And the training quality level is improved through the optimization of the motion time period timing training method.

The perfect system is an important guarantee for the smooth progress of track and field training, so the school should pay attention to the perfection of the relevant training system. When students carry out track and field training, the school should adjust the time of students' cultural class and track and field training, so as to avoid the interruption of students' training or the inability of cultural class to carry out properly because of time conflict. In addition, the school should formulate the relevant training plan according to the specific situation of the student training, in order to urge the students and the teachers to carry on the training strictly. In a word, track and field training can not only effectively promote the physical and mental development of students, but also make students' thinking ability develop to a certain extent. In order to strengthen the intensity of students' track and field sports and the amount of training, teachers need to formulate a scientific and reasonable teaching program, which cannot blindly strengthen the training of students and increase the amount of training. Therefore, the teacher should understand the physical condition of each student, make the appropriate training plan according to the actual situation of the students, grasp the training intensity and quantity reasonably, and arrange the students to carry on the training in a planned way.

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