1 Supplementary for Lemma 3.5

The following is the list of values p_1, p_2, q_1, q_2 after the specified change of coordinates, as well as the domain of the new variables u, v.

Case 0: $0 \le i < b-\tau-1$. Change the variables with $u(i) = \frac{i}{b}$ and $v = \frac{1}{b}$. $0 \le u \le \frac{1}{2}$, $0 \le v \le \frac{1}{12}$ and

$$\begin{pmatrix} p_1(i) & p_2(i) \\ q_1(i) & q_2(i) \end{pmatrix} = \frac{80}{29} \begin{pmatrix} 150u(i)+865v-95 & -450u(i)-855v+285 \\ 50u(i)+675v-225 & -150u(i)-1445v+675 \end{pmatrix}.$$

Case 1: $i = b-\tau-1$. Change the variables with $u = \frac{\tau}{b}$ and $v = \frac{1}{b}$. $\frac{5}{11} \le u \le 1$, $0 \le v \le \frac{1}{12}$ and

$$\begin{pmatrix} p_1(i) & p_2(i) \\ q_1(i) & q_2(i) \end{pmatrix} = \frac{80}{29} \begin{pmatrix} -150u(i)-635v+55 & 450u(i)+165v-165 \\ -50u(i)+175v-175 & 150u(i)-1105v+525 \end{pmatrix}.$$

Case 2: $b-\tau \le i < 2b-2\tau-2$. Change the variables with $u(i) = \frac{i}{b}$ and $v = \frac{1}{b}$. $0 \le u \le 1$, $0 \le v \le \frac{1}{12}$ and

$$\begin{pmatrix} p_1(i) & p_2(i) \\ q_1(i) & q_2(i) \end{pmatrix} = \frac{80}{29} \begin{pmatrix} 150u(i)+565v-95 & -450u(i)+45v+285 \\ 50u(i)+575v-225 & -150u(i)-1145v+675 \end{pmatrix}.$$

Case 3: $i = 2b-2\tau-2$. Change the variables with $u = \frac{\tau}{b}$ and $v = \frac{1}{b}$. $\frac{5}{11} \le u \le 1$, $0 \le v \le \frac{1}{12}$ and

$$\begin{pmatrix} p_1(i) & p_2(i) \\ q_1(i) & q_2(i) \end{pmatrix} = \frac{80}{29} \begin{pmatrix} -600u(i)+1025v+410 & 1800u(i)+1681v-1230 \\ -200u(i)-625v-250 & 600u(i)-1025v+750 \end{pmatrix}.$$

Case 4: $i = 2b-2\tau-1$. Change the variables with $u = \frac{\tau}{b}$ and $v = \frac{1}{b}$. $\frac{11}{24} \le u \le 1$, $0 \le v \le \frac{1}{12}$ and

$$\begin{pmatrix} p_1(i) & p_2(i) \\ q_1(i) & q_2(i) \end{pmatrix} = \frac{80}{29} \begin{pmatrix} -600u(i)+445v+410 & 1800u(i)+869v-1230 \\ -200u(i)+2275v-250 & 600u(i)-1605v+750 \end{pmatrix}.$$

Case 5: $2b-2\tau-1 < i \le b-1$. Change the variables with $u(i) = \frac{i}{b}$ and $v = \frac{1}{b}$. $0 \le u \le 1$, $0 \le v \le \frac{1}{12}$ and

$$\begin{pmatrix} p_1(i) & p_2(i) \\ q_1(i) & q_2(i) \end{pmatrix} = \frac{80}{29} \begin{pmatrix} 150u(i)+565v-95 & -450u(i)+45v+285 \\ 50u(i)+575v-225 & -150u(i)-1145v+675 \end{pmatrix}.$$

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