

**APPENDIX C**  
Fundamental Frequency Trajectories

### C. Fundamental Frequency

Appendix C indicates fundamental frequency ( $F_0$ ) trajectories of 110 test words. Since vowel-magnitude difference function ( $V_{MDF}$ ) and average magnitude difference function ( $AMDF$ ) provide the same  $F_0$  trajectories, we compare our  $F_0$  trajectories between  $V_{MDF}$  and autocorrelation ( $AC$ ). Figures C.1 – C.110 show the  $F_0$  trajectories of  $V_{MDF}$  and  $AC$ .

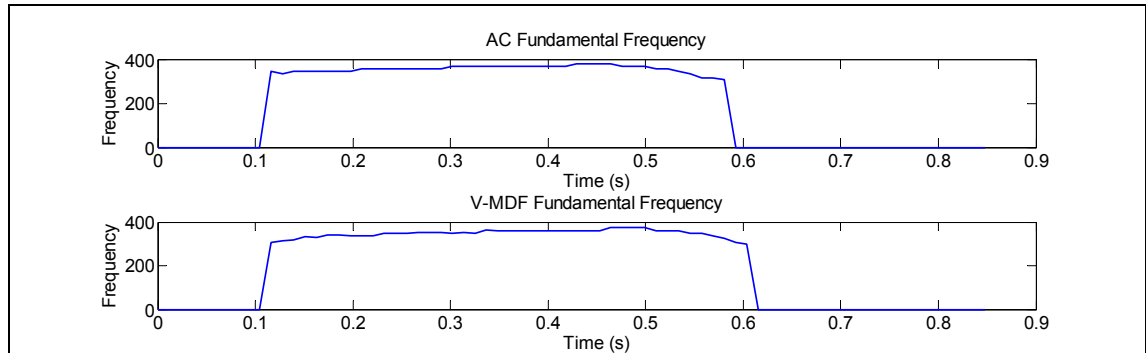


Figure C.1  $F_0$  trajectory of “ $m\bar{a}a$ ”

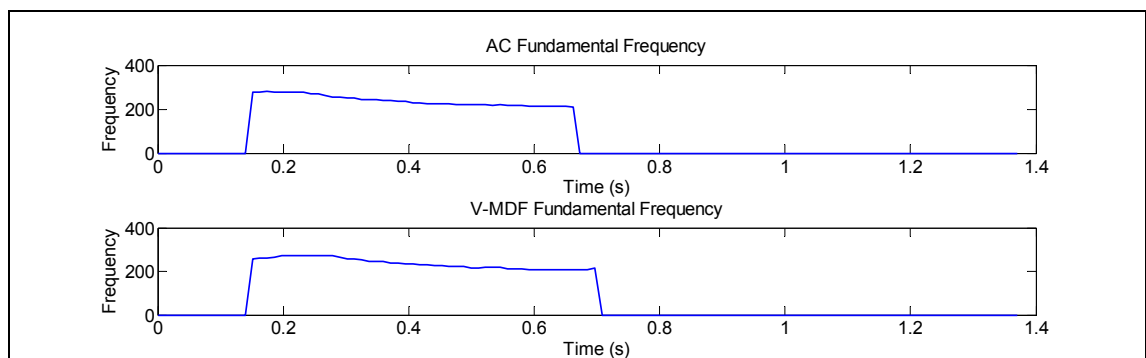


Figure C.2  $F_0$  trajectory of “ $m'aa$ ”

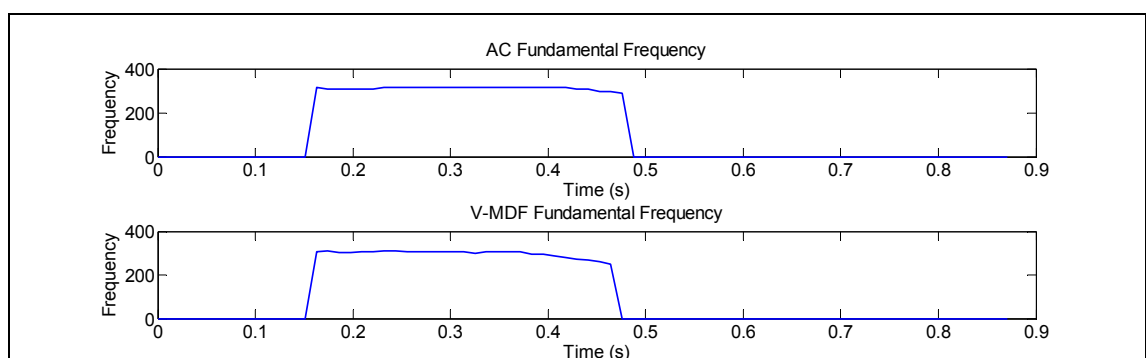


Figure C.3  $F_0$  trajectory of “ $m\hat{a}a$ ”

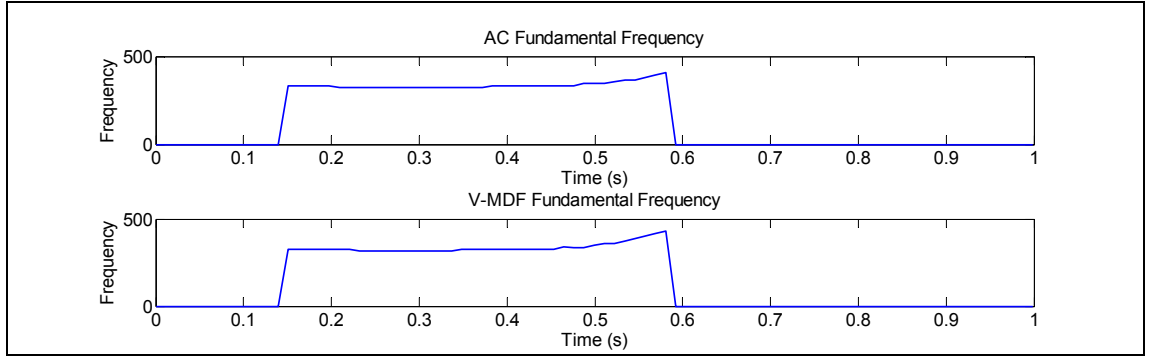


Figure C.4  $F_0$  trajectory of "ma'a"

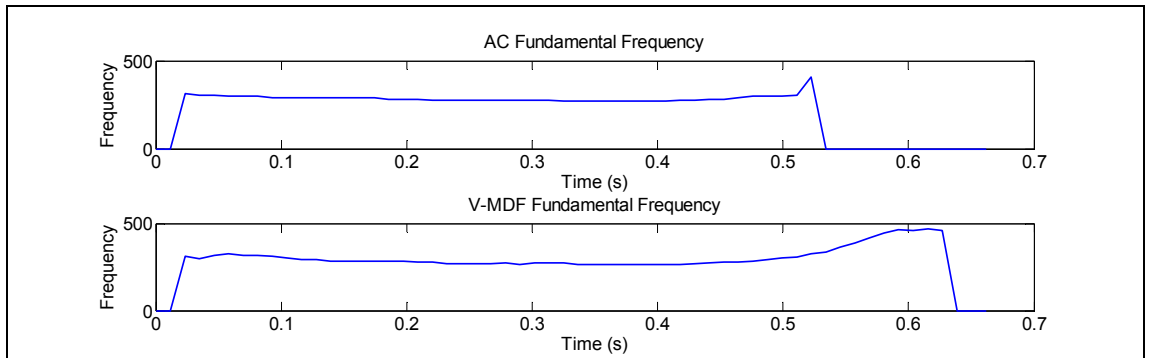


Figure C.5  $F_0$  trajectory of "maa"

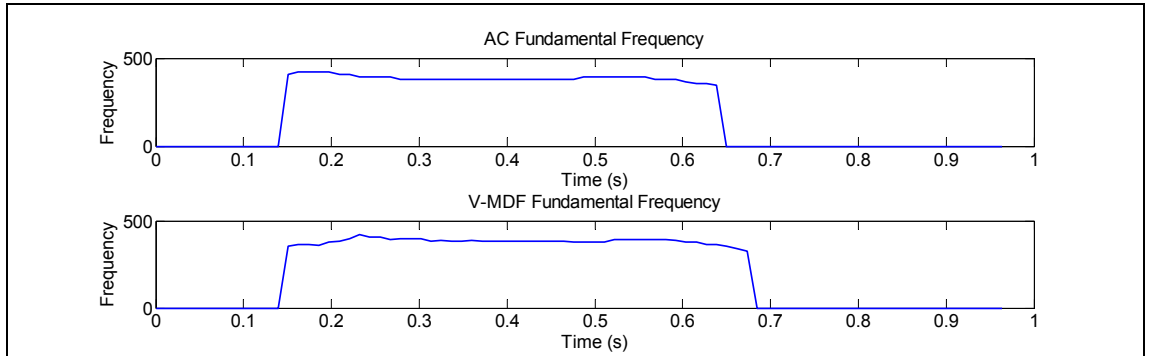


Figure C.6  $F_0$  trajectory of "mii"

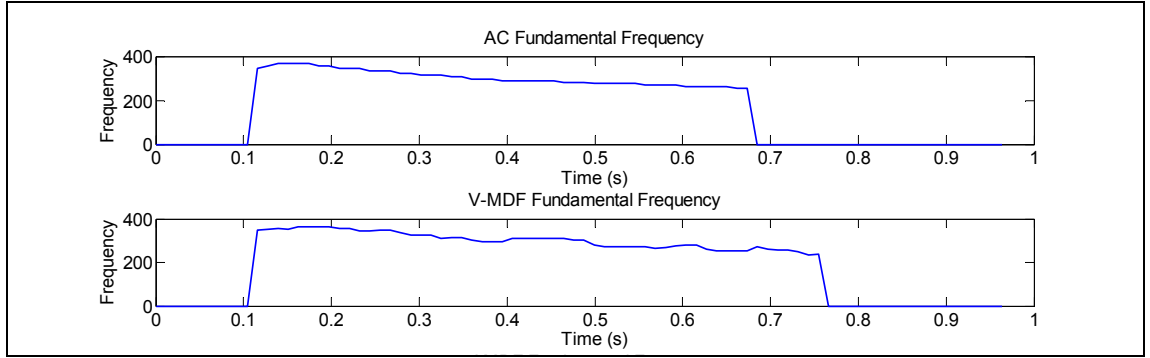


Figure C.7  $F_0$  trajectory of "m'ii"

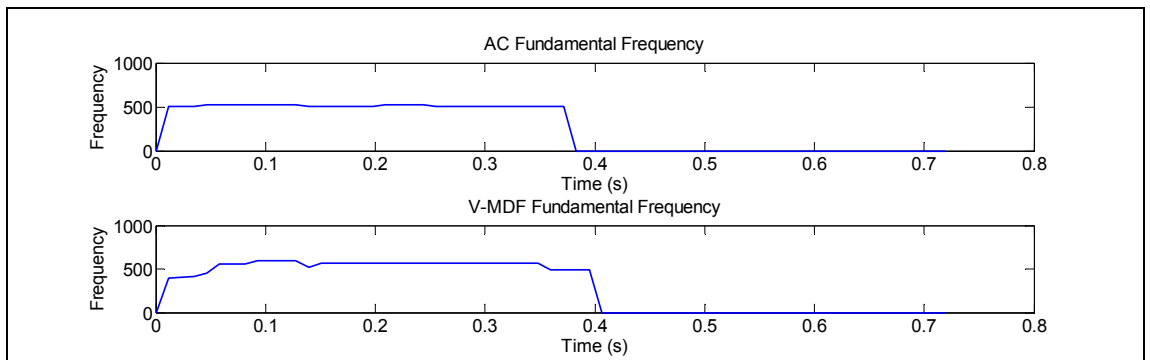


Figure C.8  $F_0$  trajectory of "mi'hat{i}"

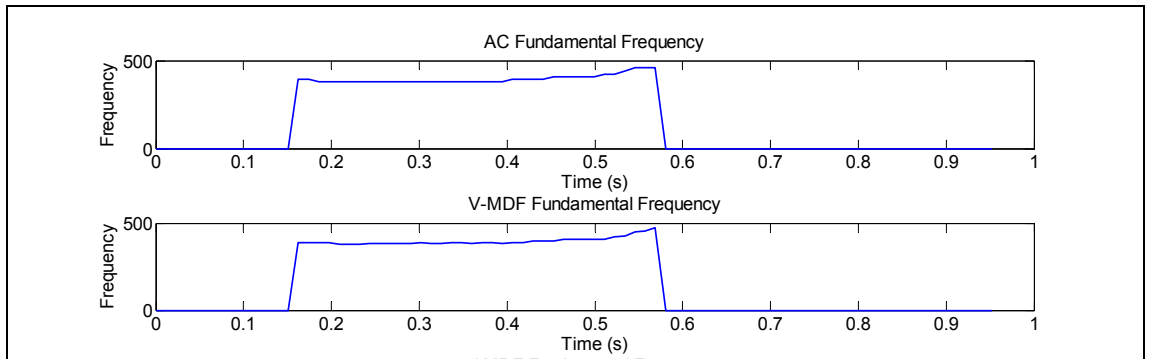
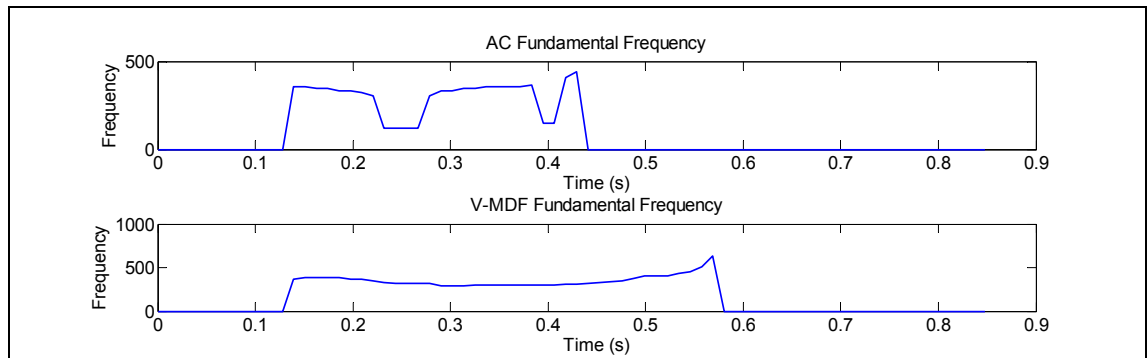
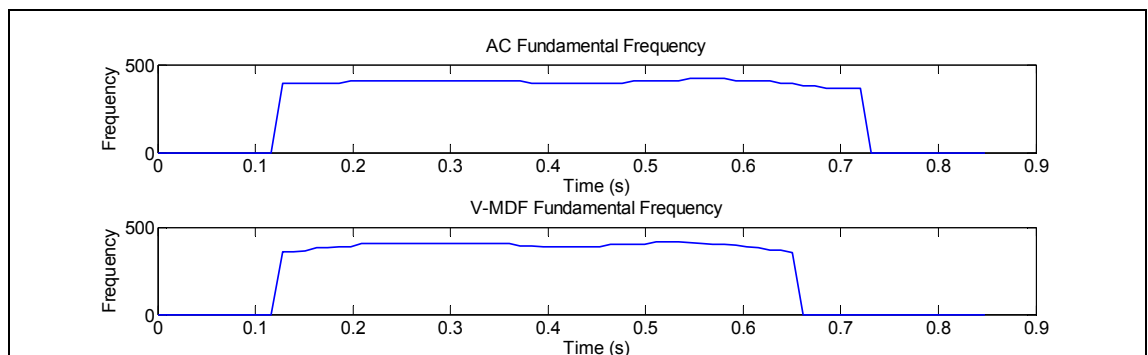


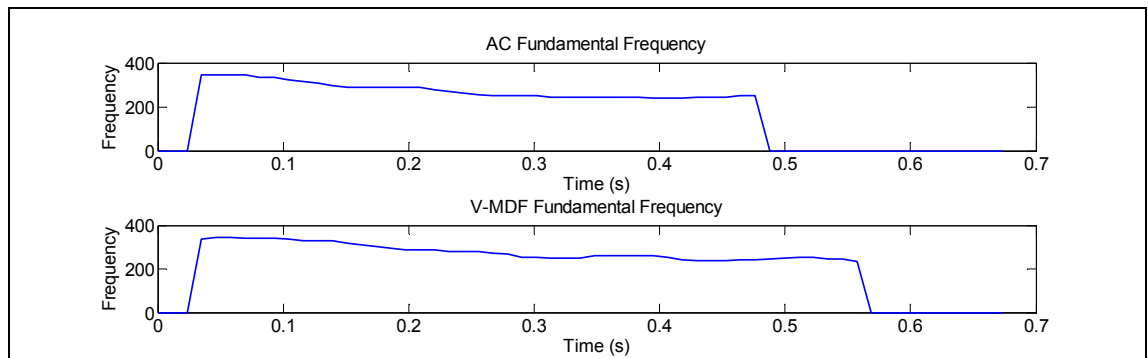
Figure C.9  $F_0$  trajectory of "mi'i"



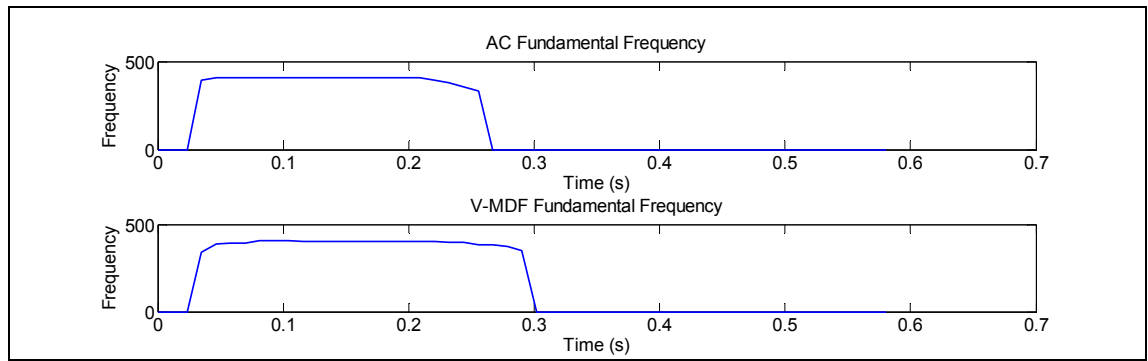
**Figure C.10**  $F_0$  trajectory of “ $m\bar{i}i$ ”



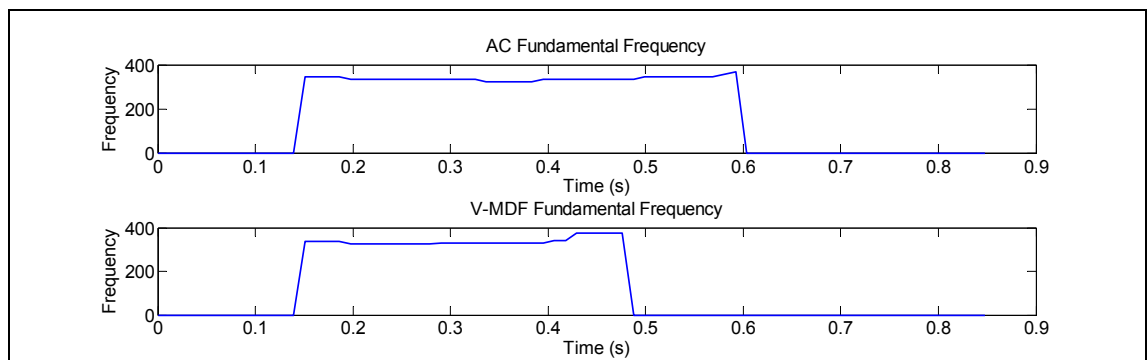
**Figure C.11**  $F_0$  trajectory of “ $m\bar{a}y$ ”



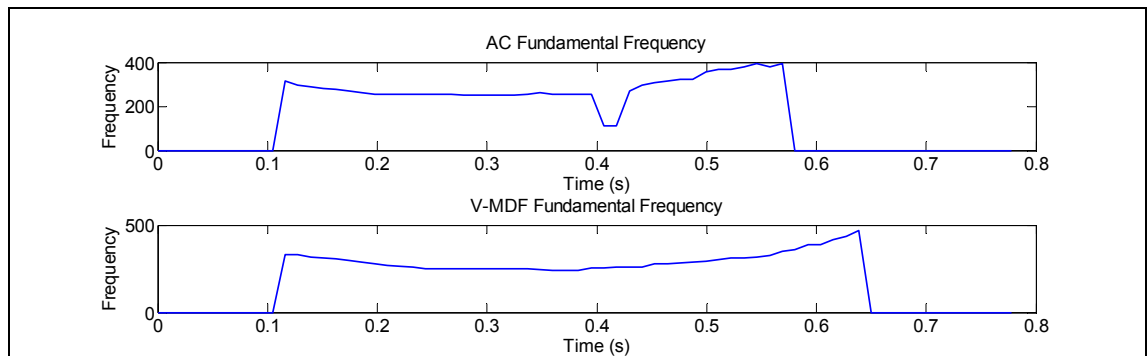
**Figure C.12**  $F_0$  trajectory of “ $m`ay$ ”



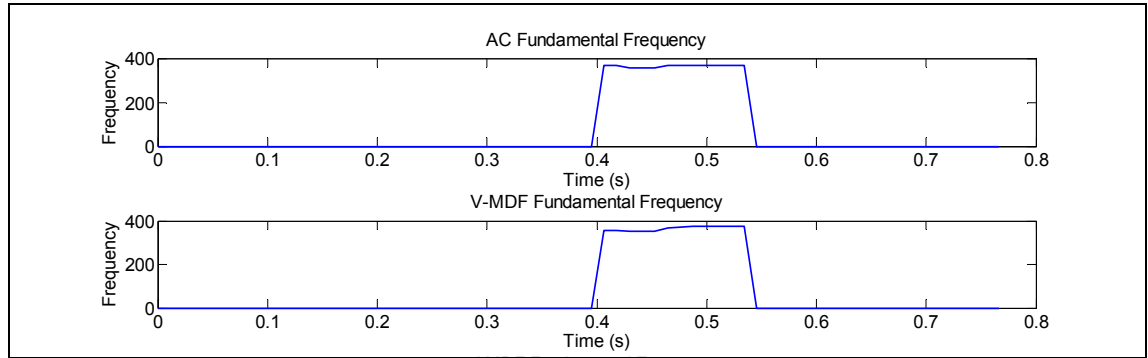
**Figure C.13**  $F_0$  trajectory of "mây"



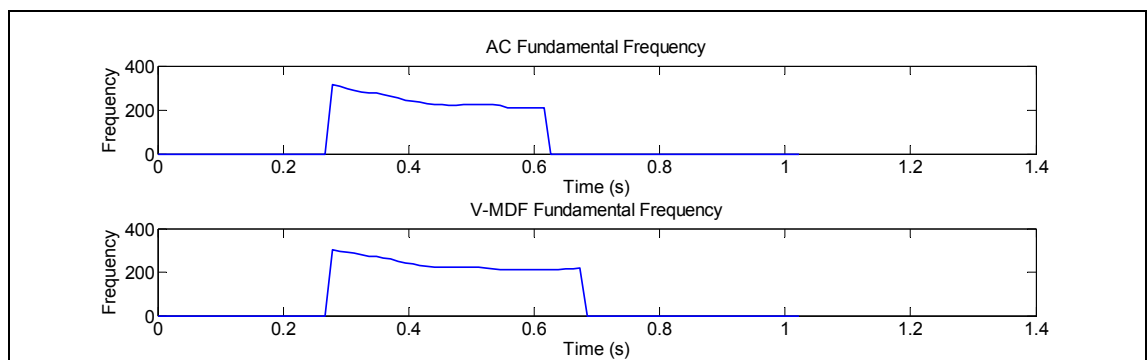
**Figure C.14**  $F_0$  trajectory of "ma'y"



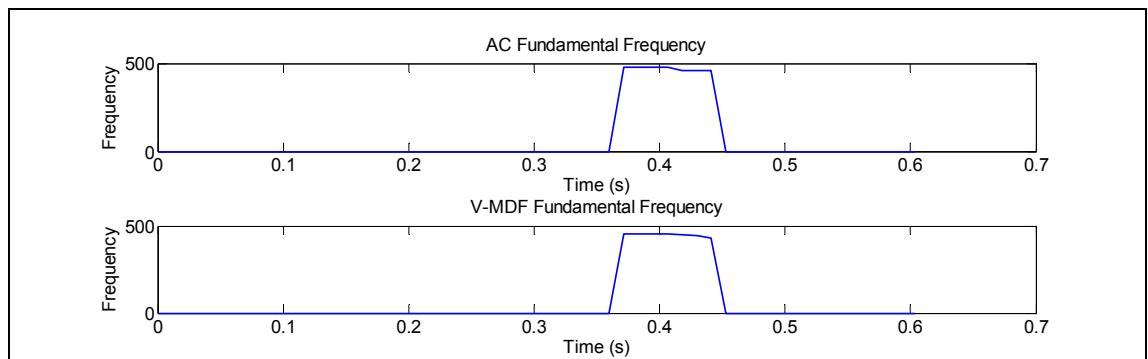
**Figure C.15**  $F_0$  trajectory of "măy"



**Figure C.16**  $F_0$  trajectory of "khāy"



**Figure C.17**  $F_0$  trajectory of "khāy"



**Figure C.18**  $F_0$  trajectory of "khây"

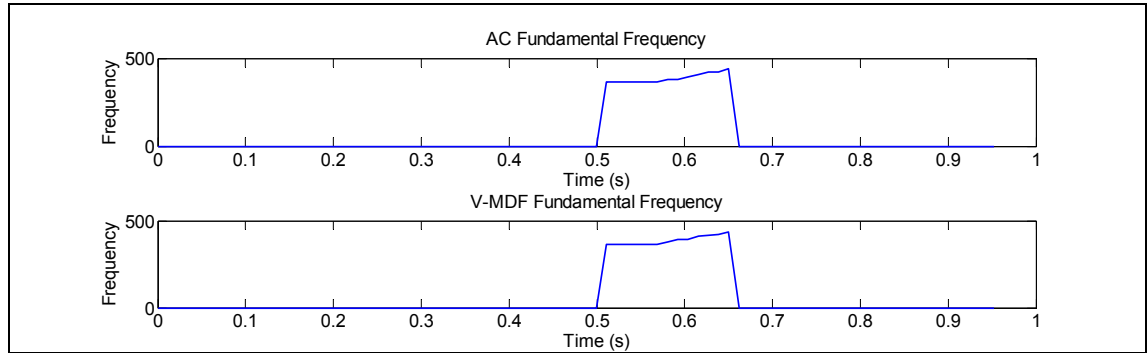


Figure C.19  $F_0$  trajectory of "kha'y"

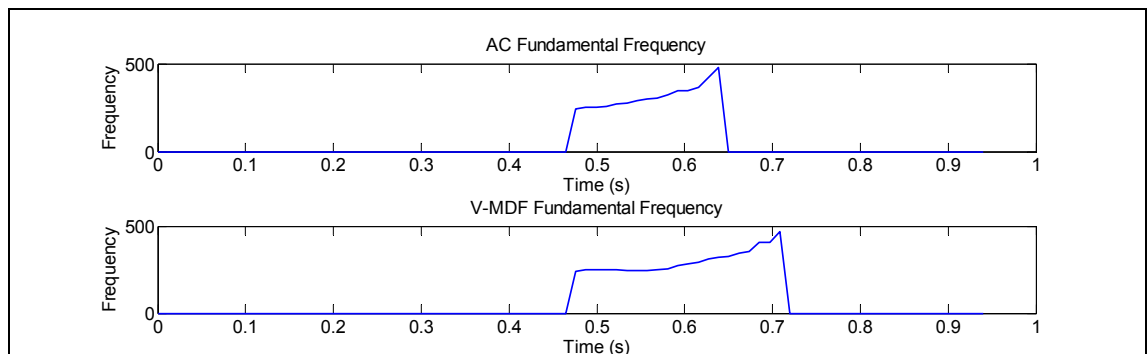


Figure C.20  $F_0$  trajectory of "khāy"

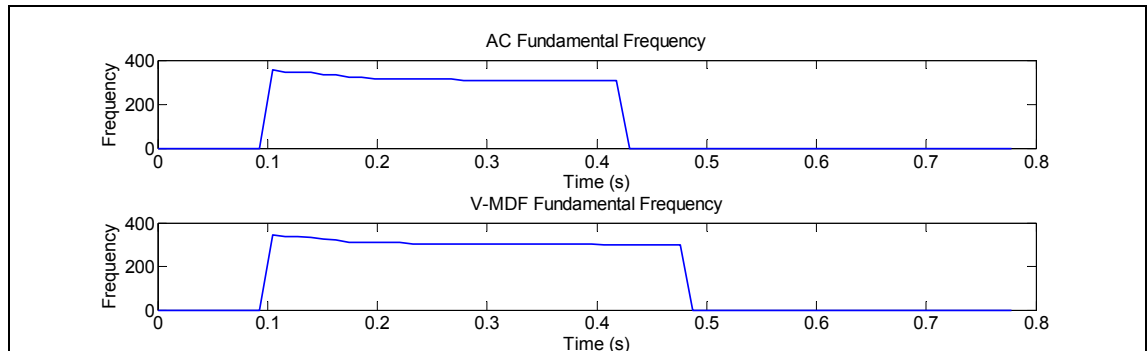
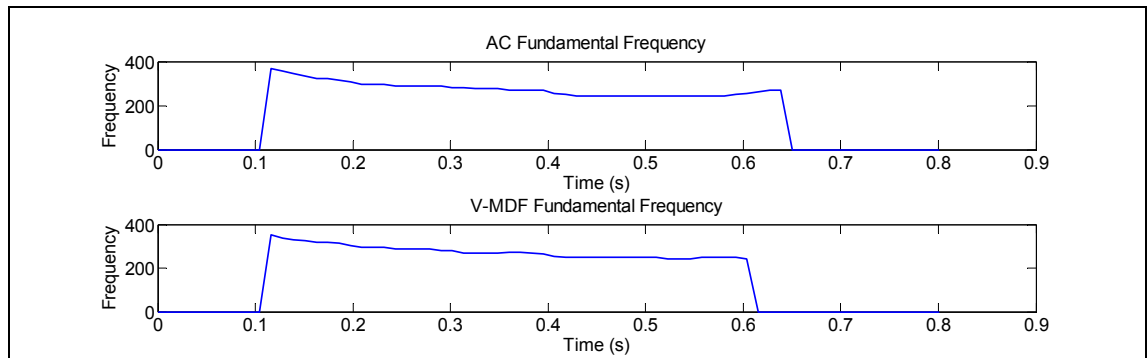
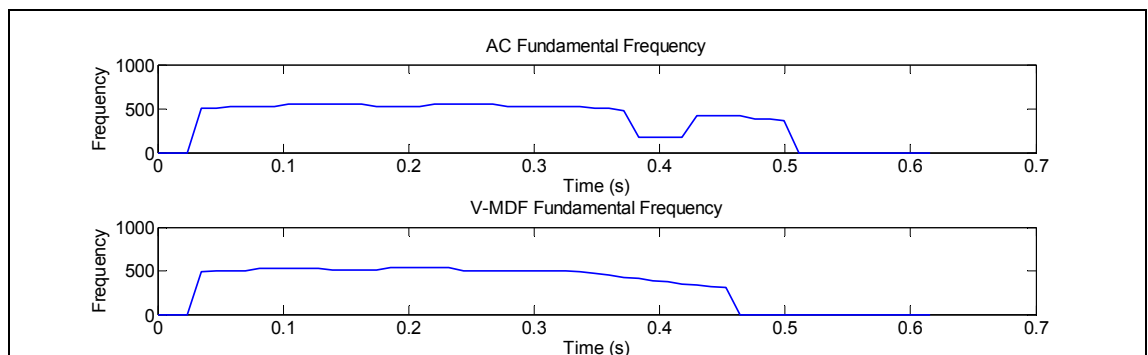


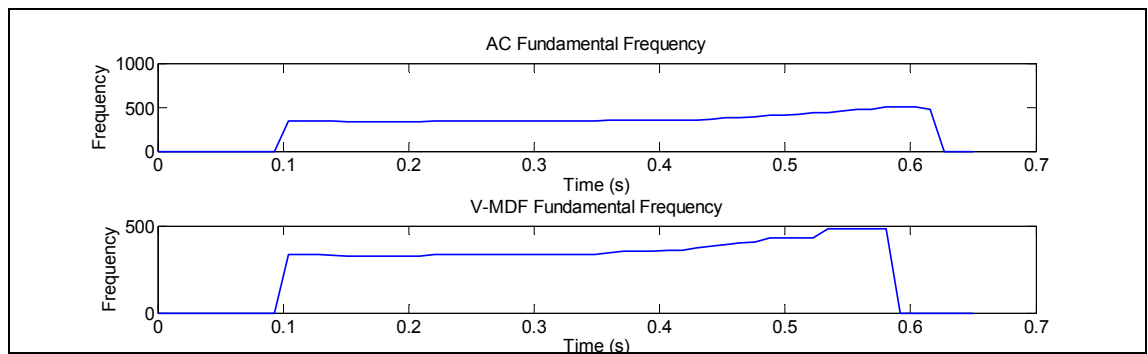
Figure C.21  $F_0$  trajectory of "kāy"



**Figure C.22**  $F_0$  trajectory of "k'ay"



**Figure C.23**  $F_0$  trajectory of "ka'y"



**Figure C.24**  $F_0$  trajectory of "ka'y"

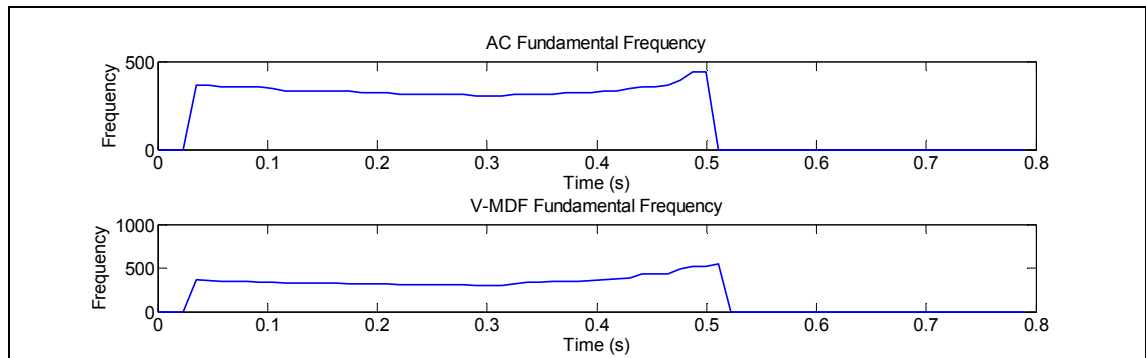


Figure C.25  $F_0$  trajectory of "kāy"

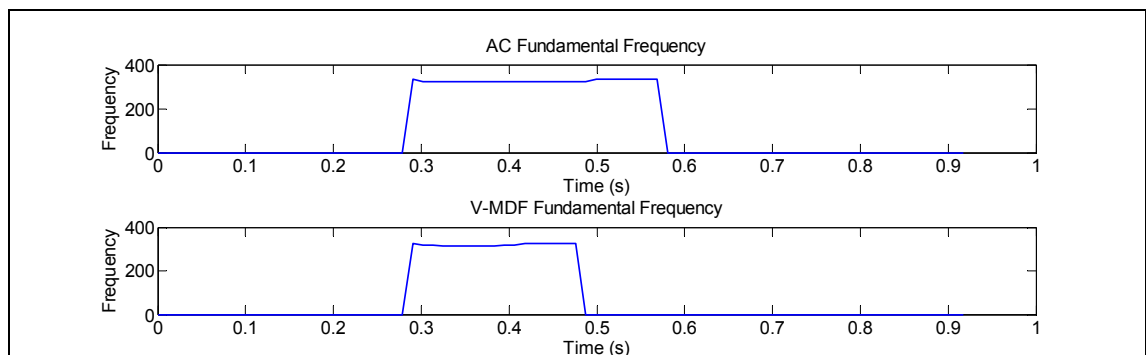


Figure C.26  $F_0$  trajectory of "khāa"

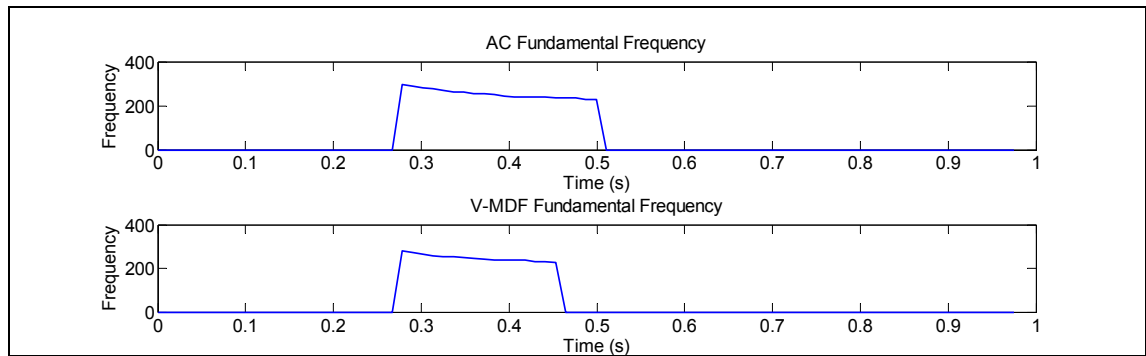
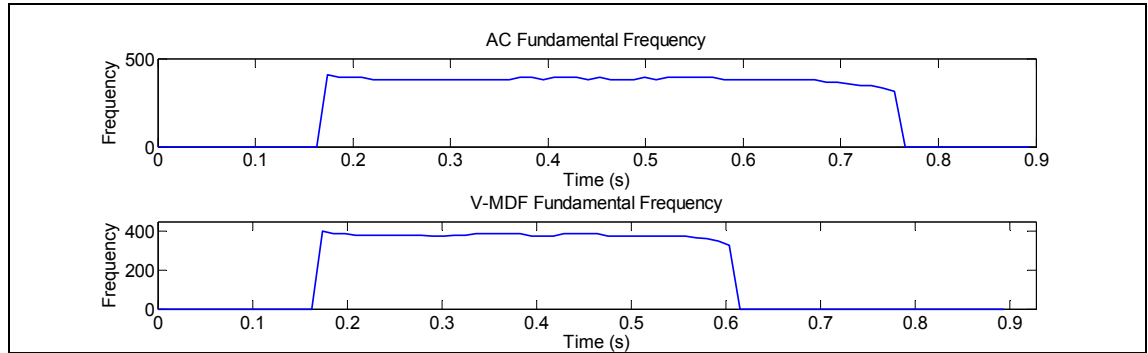
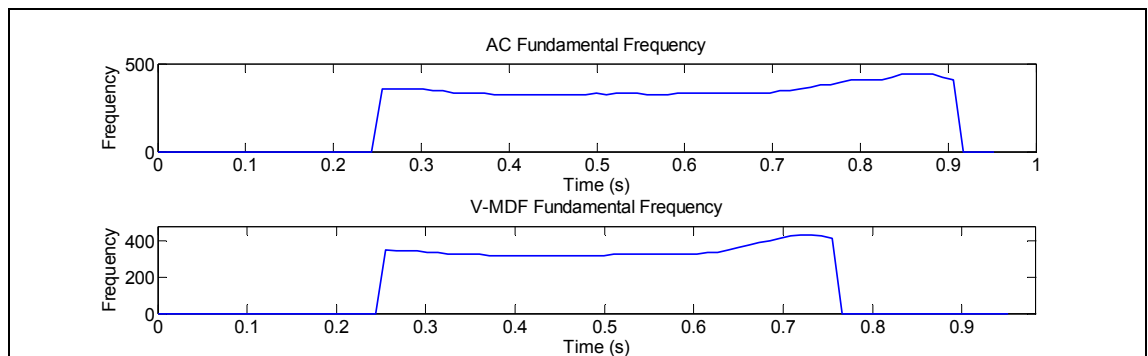


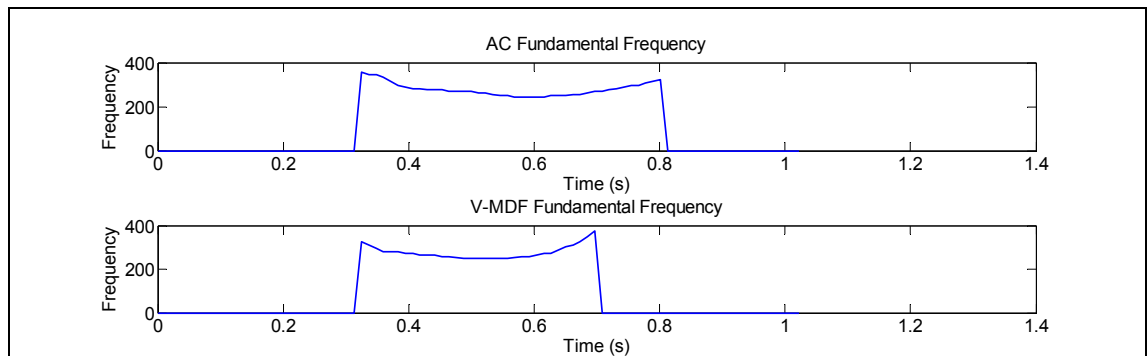
Figure C.27  $F_0$  trajectory of "kh'aa"



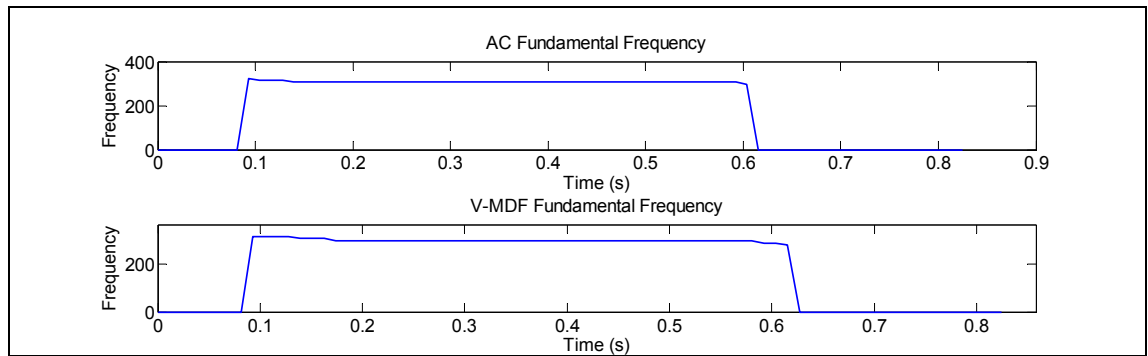
**Figure C.28**  $F_0$  trajectory of “*khâa*”



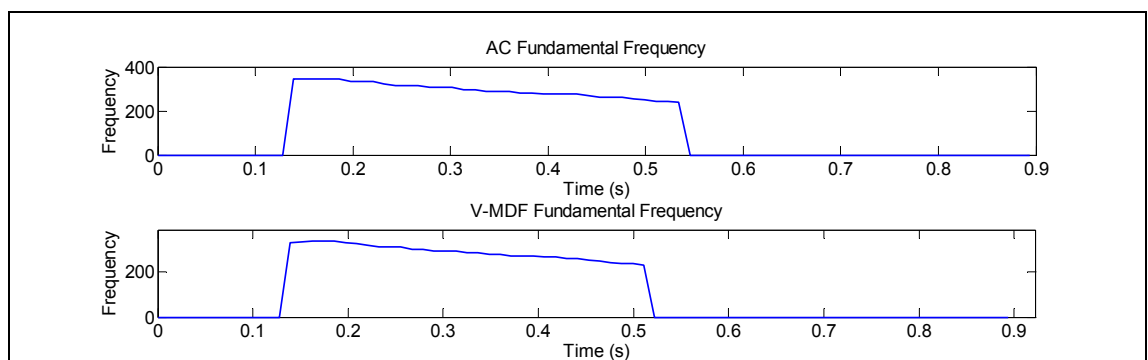
**Figure C.29**  $F_0$  trajectory of “*kha'a*”



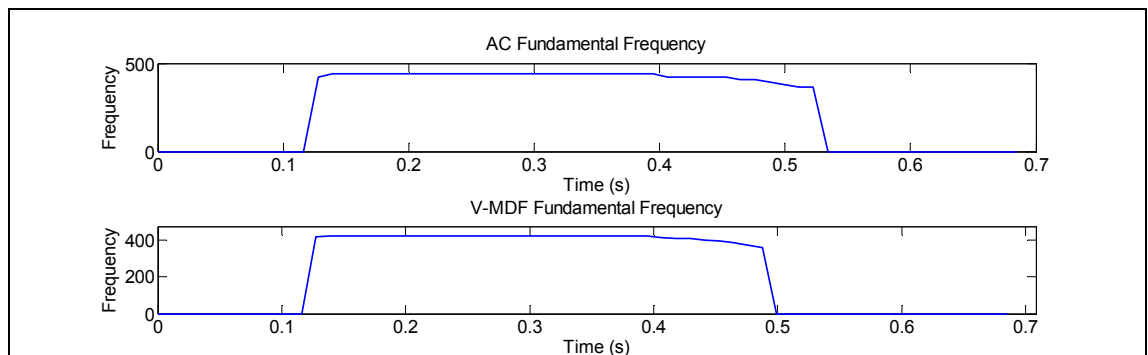
**Figure C.30**  $F_0$  trajectory of “*khãa*”



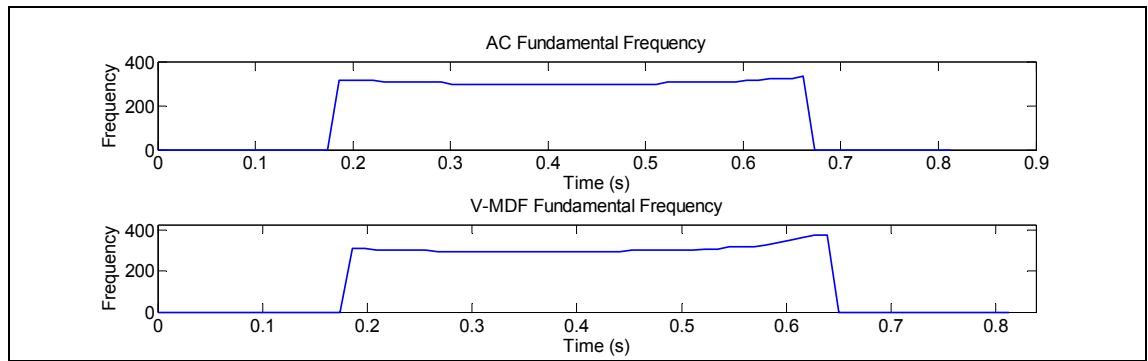
**Figure C.31**  $F_0$  trajectory of "naa"



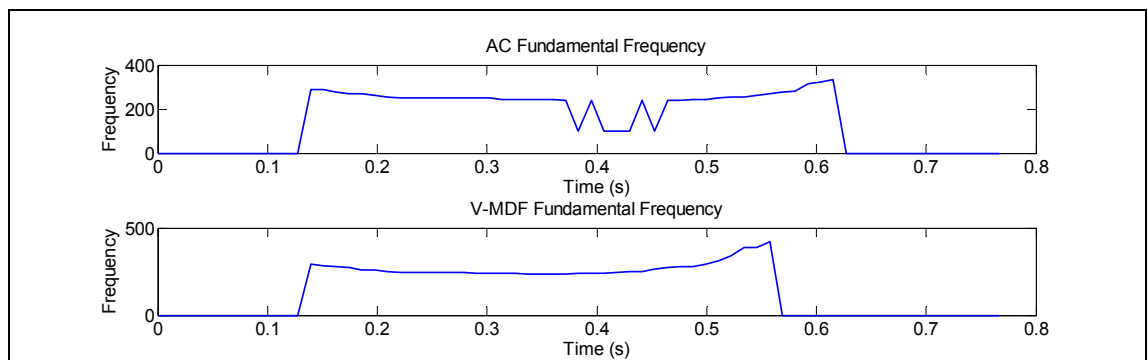
**Figure C.32**  $F_0$  trajectory of "na'a"



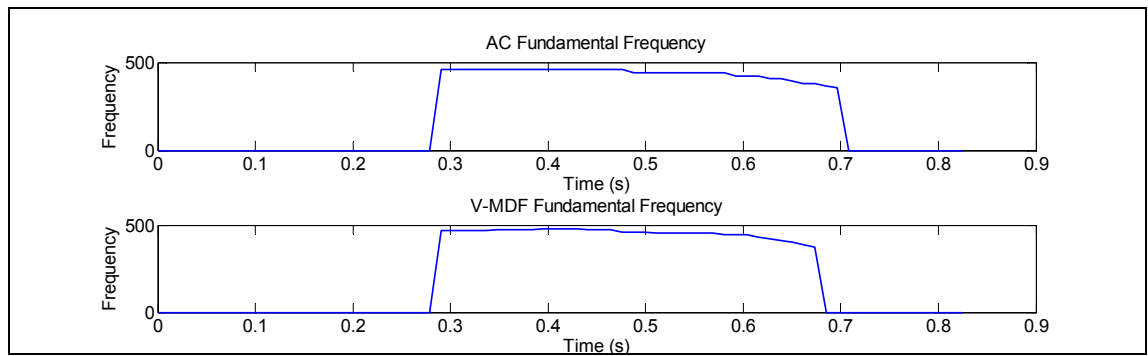
**Figure C.33**  $F_0$  trajectory of "naa"



**Figure C.34**  $F_0$  trajectory of “*n`aa*”



**Figure C.35**  $F_0$  trajectory of “*naa*”



**Figure C.36**  $F_0$  trajectory of “*chiu*”

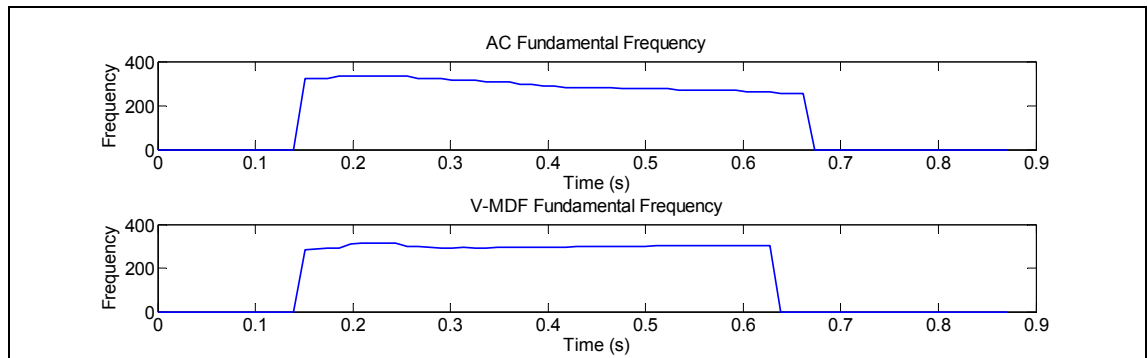


Figure C.37  $F_0$  trajectory of "m\u028c\u028c"

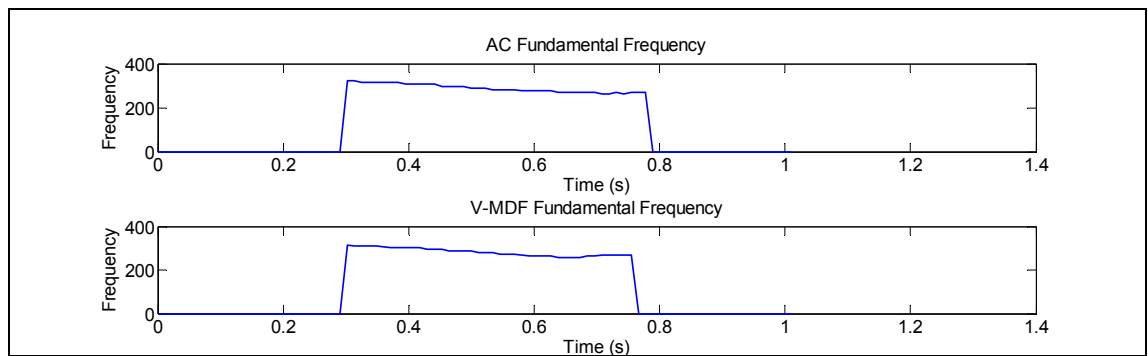


Figure C.38  $F_0$  trajectory of "s\u0304\u0304\u0304y"

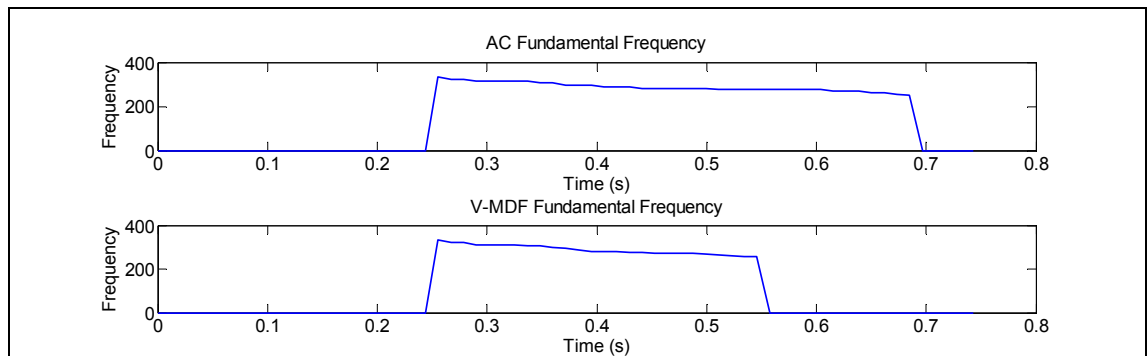
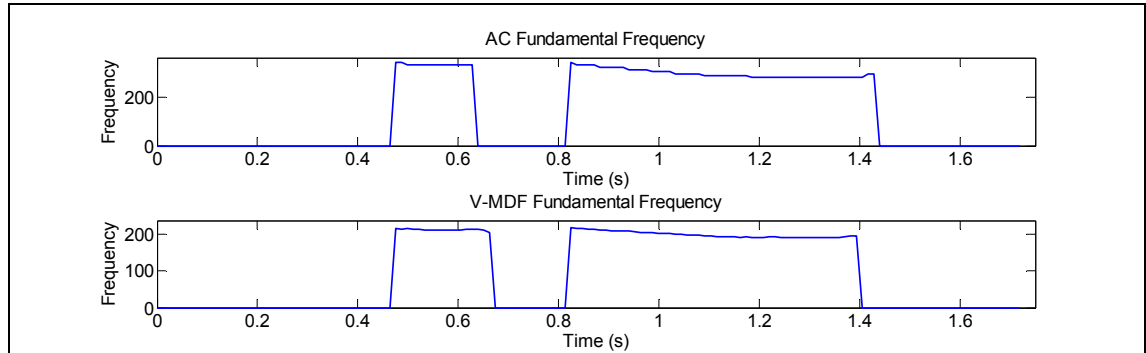
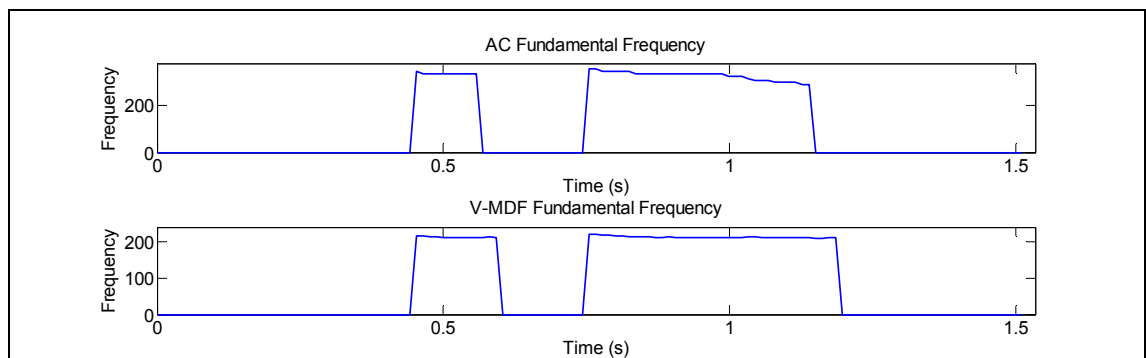


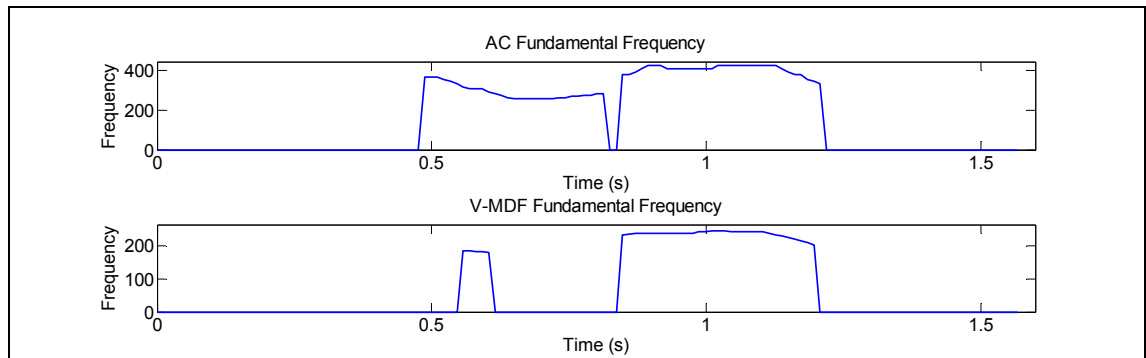
Figure C.39  $F_0$  trajectory of "khe'e"



**Figure C.40**  $F_0$  trajectory of “*lām/phōŋ*”



**Figure C.41**  $F_0$  trajectory of “*hēen/frīi*”



**Figure C.42**  $F_0$  trajectory of “*sīaŋ/rīak*”

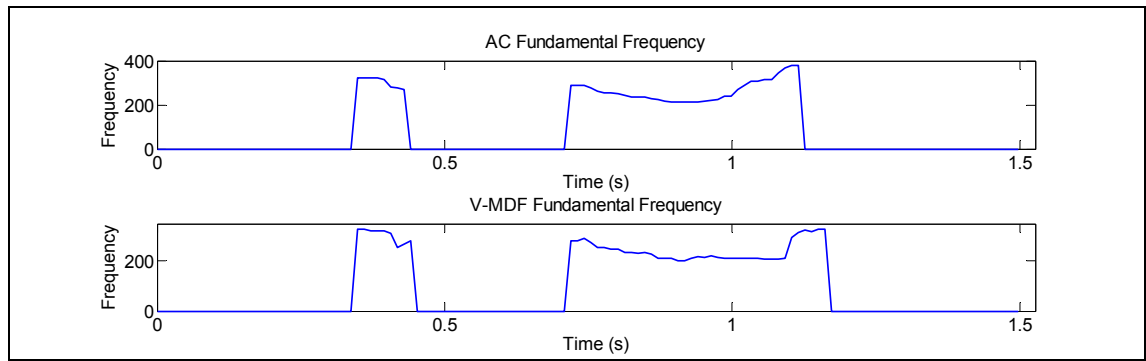


Figure C.43  $F_0$  trajectory of “*pə̀ət/si̇aŋ*”

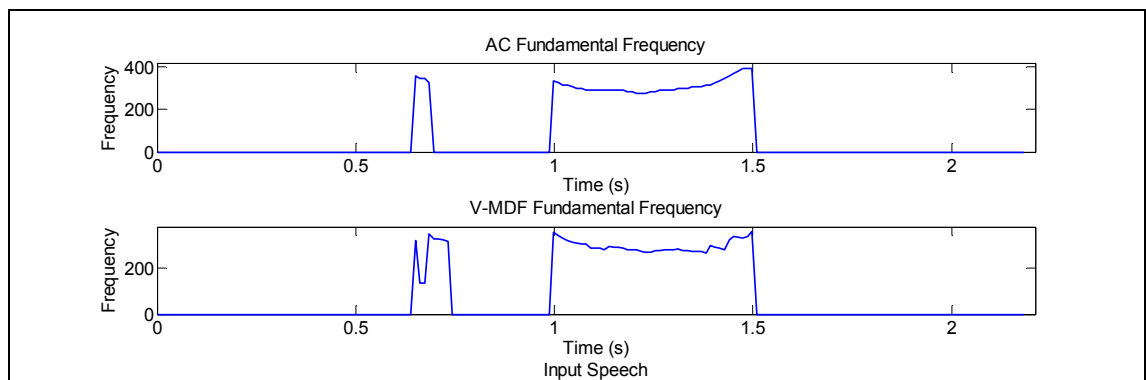


Figure C.44  $F_0$  trajectory of “*p̄it/si̇aŋ*”

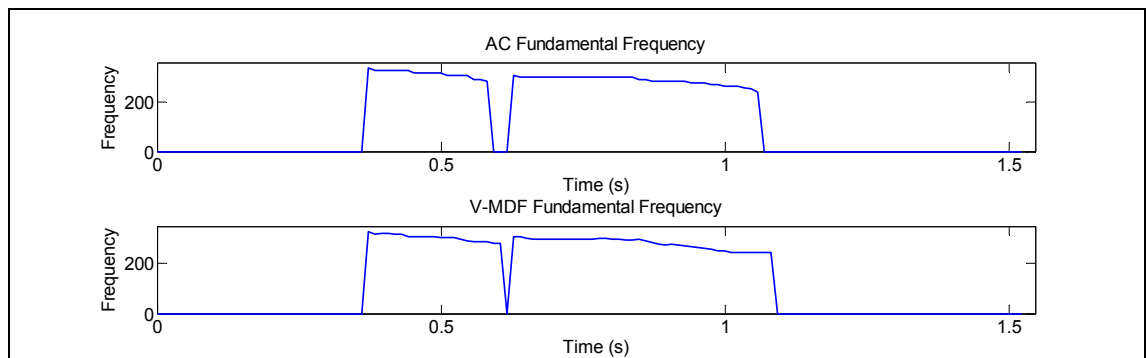


Figure C.45  $F_0$  trajectory of “*tām/bōn*”

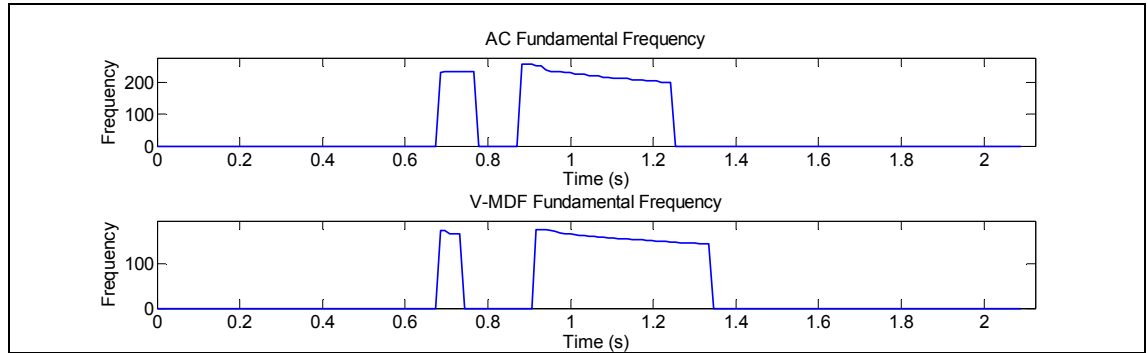


Figure C.46  $F_0$  trajectory of “သံဝါမ / ပါဝါဝါ”

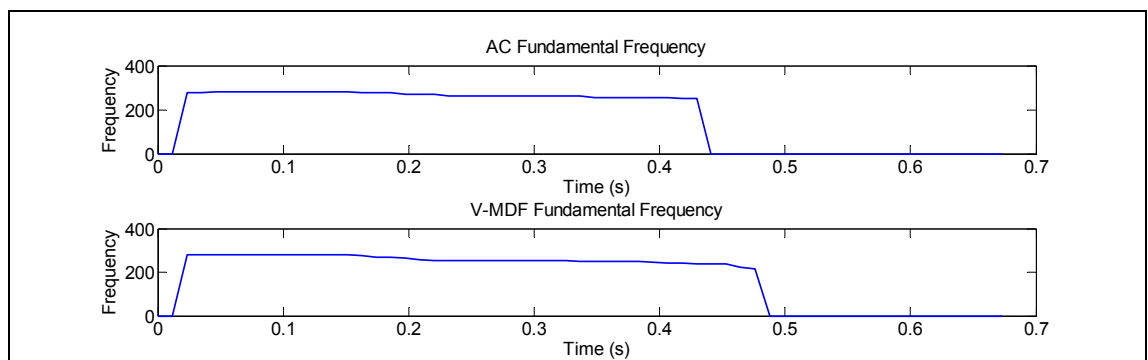


Figure C.47  $F_0$  trajectory of “လံဝါ”

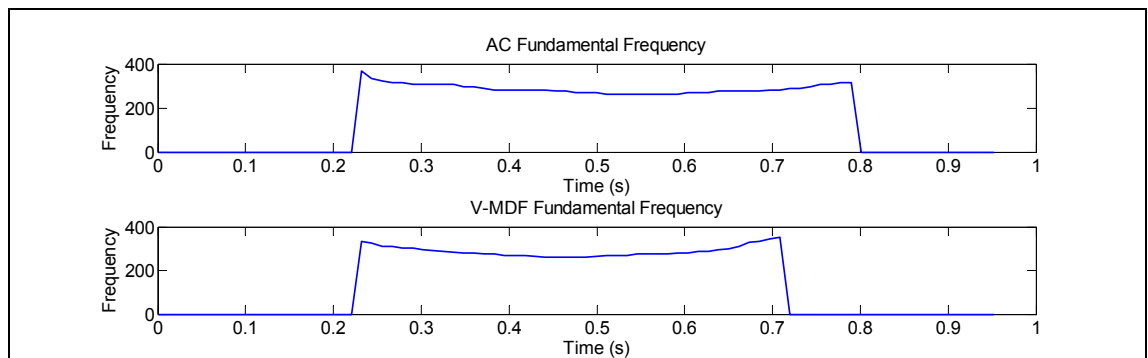


Figure C.48  $F_0$  trajectory of “ခါဝါ”

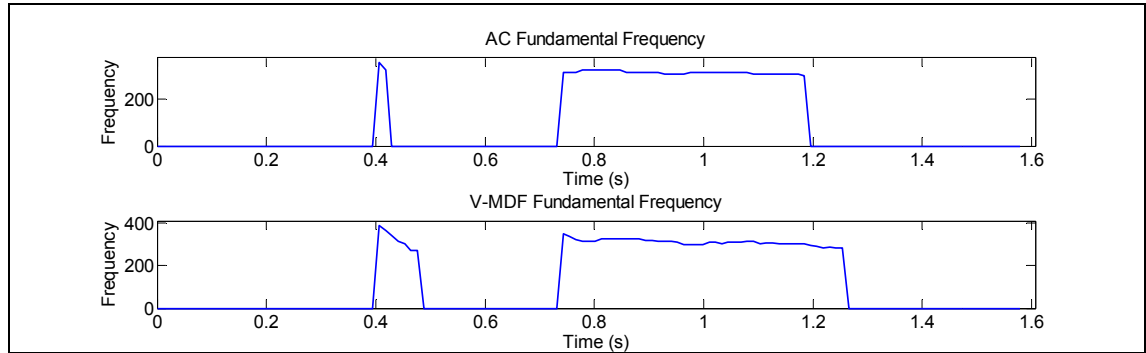


Figure C.49  $F_0$  trajectory of “*th`at / pāy*”

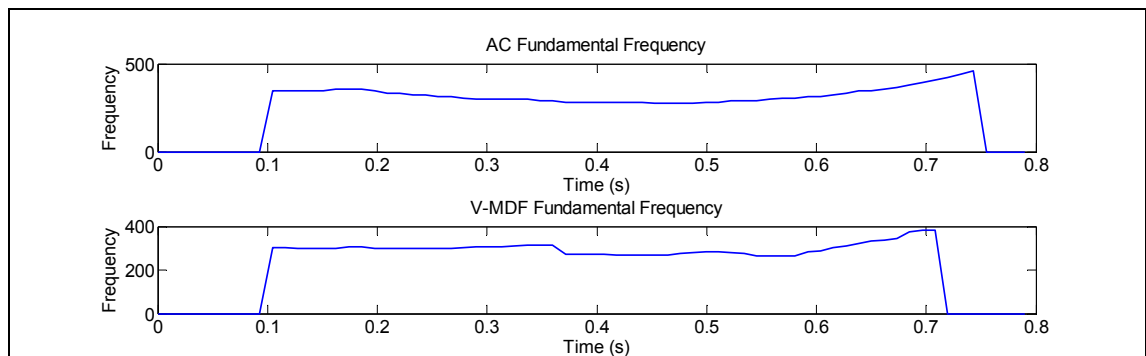


Figure C.50  $F_0$  trajectory of “*hm̃an*”

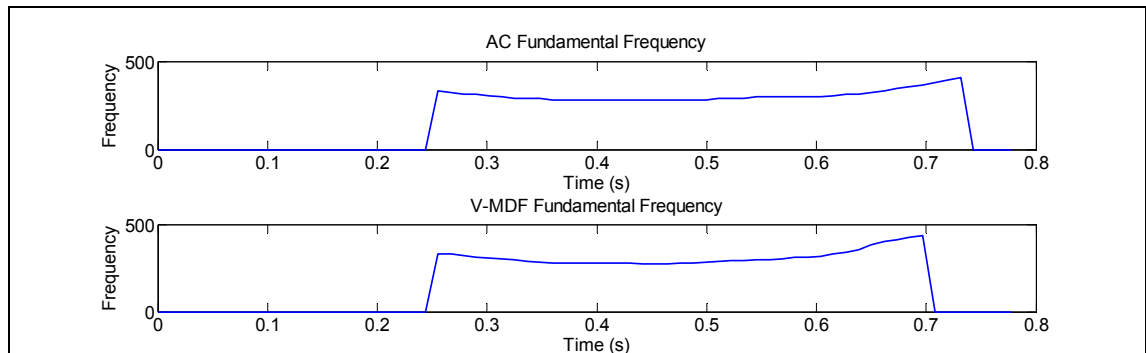
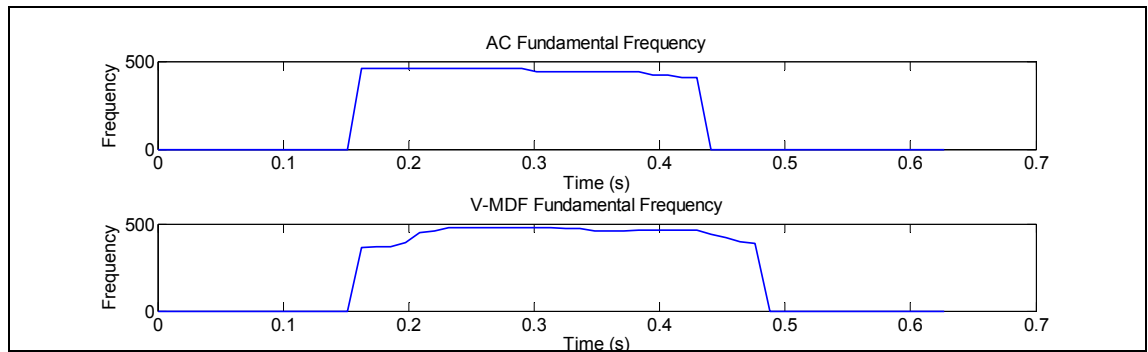
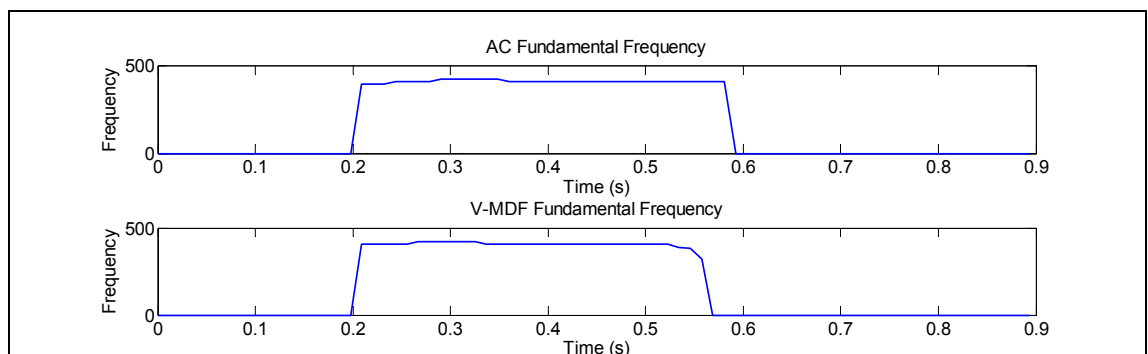


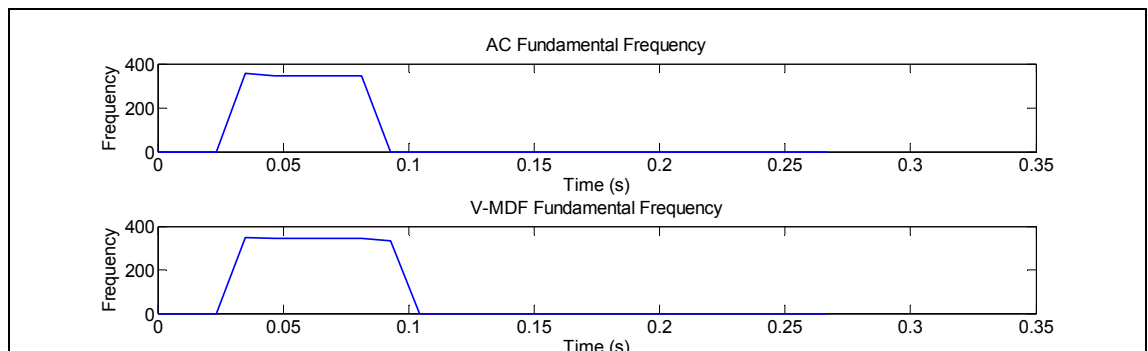
Figure C.51  $F_0$  trajectory of “*thěεw*”



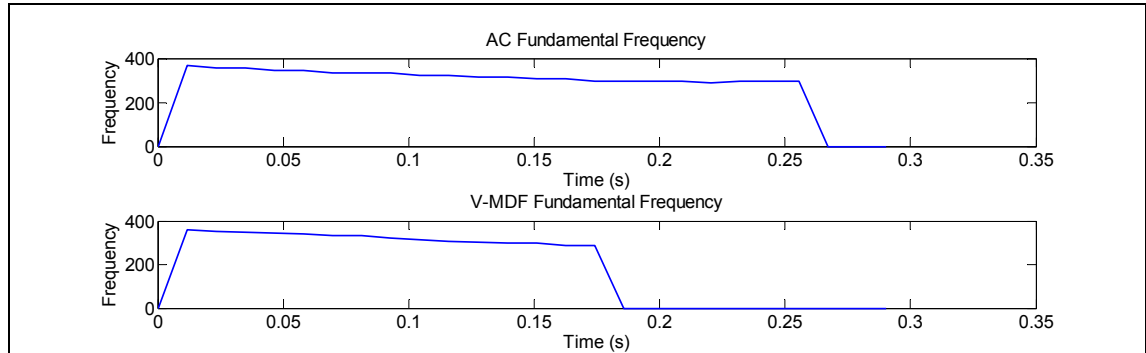
**Figure C.52**  $F_0$  trajectory of "lûak"



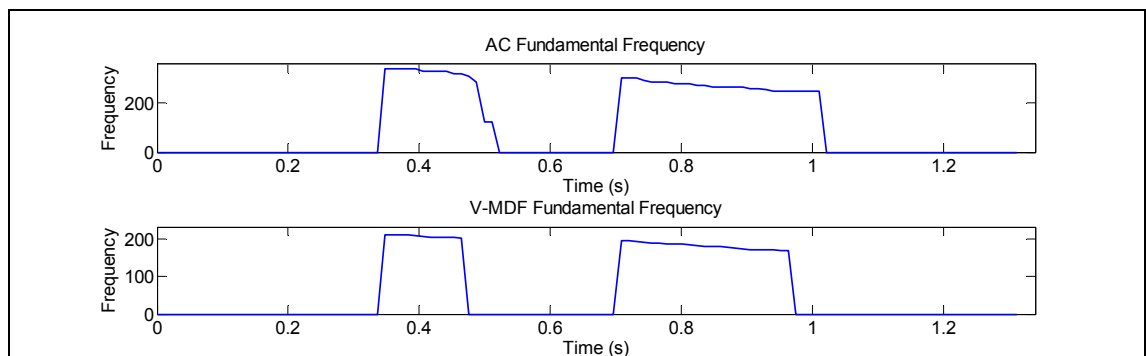
**Figure C.53**  $F_0$  trajectory of "khâam"



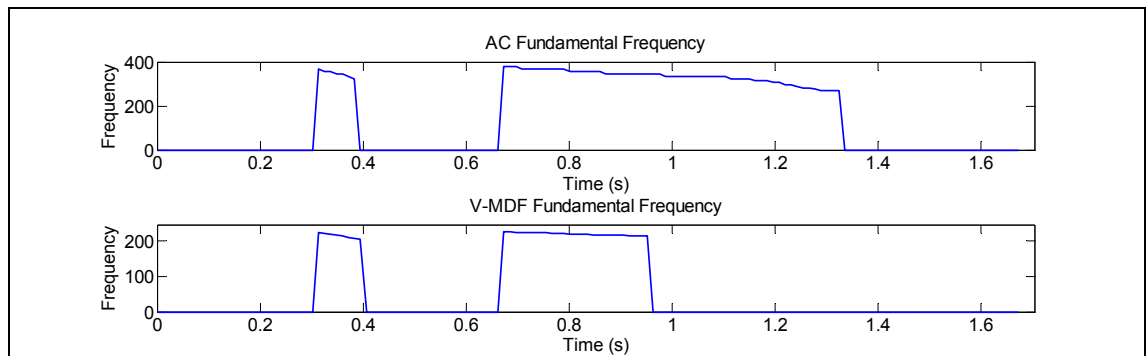
**Figure C.54**  $F_0$  trajectory of "ta't"



**Figure C.55**  $F_0$  trajectory of “*pè*”



**Figure C.56**  $F_0$  trajectory of “*ɔ̄w / ɔ̄k*”



**Figure C.57**  $F_0$  trajectory of “*tok / l̄η*”

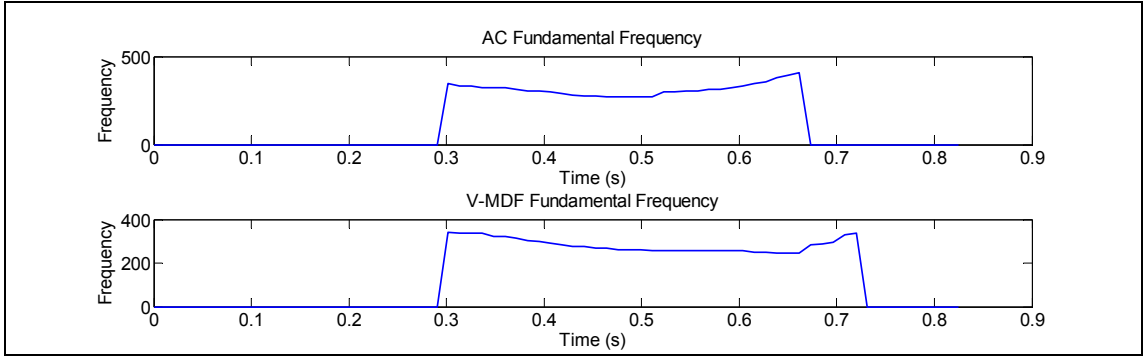


Figure C.58  $F_0$  trajectory of “*sūu η*”

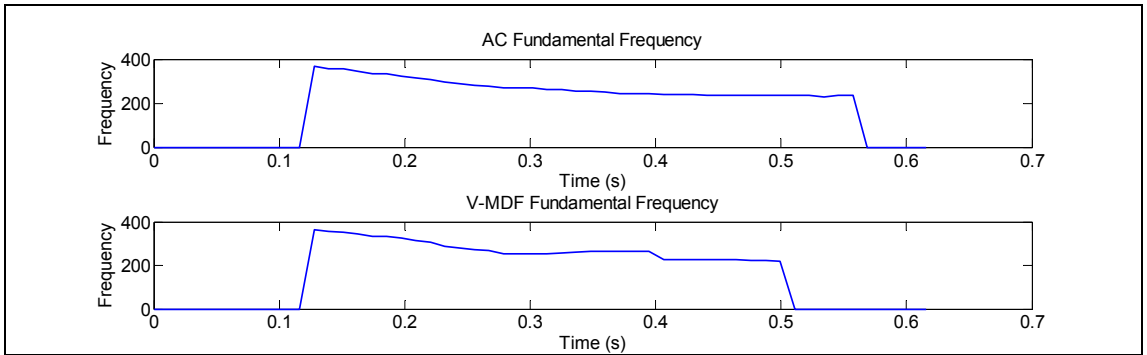


Figure C.59  $F_0$  trajectory of “*t̄am*”

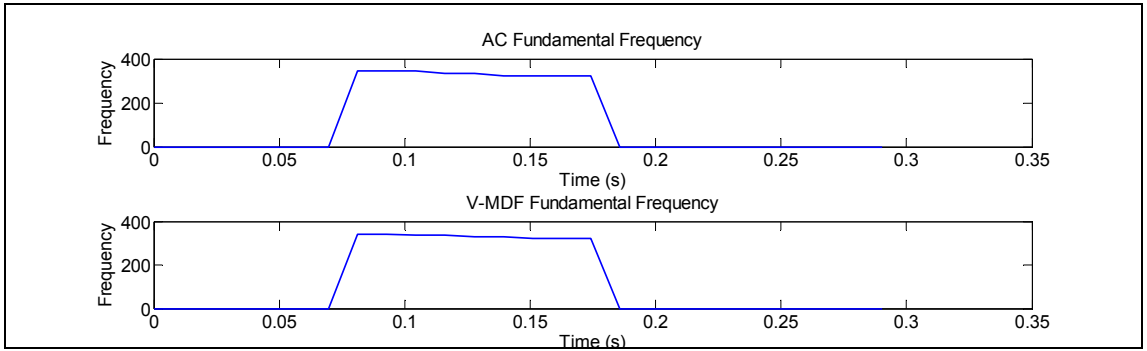


Figure C.60  $F_0$  trajectory of “*lōt*”

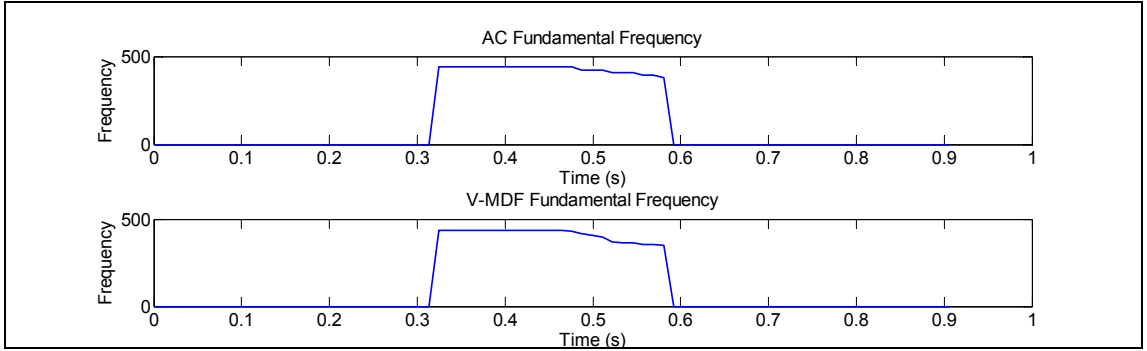


Figure C.61  $F_0$  trajectory of ‘*chōn*’

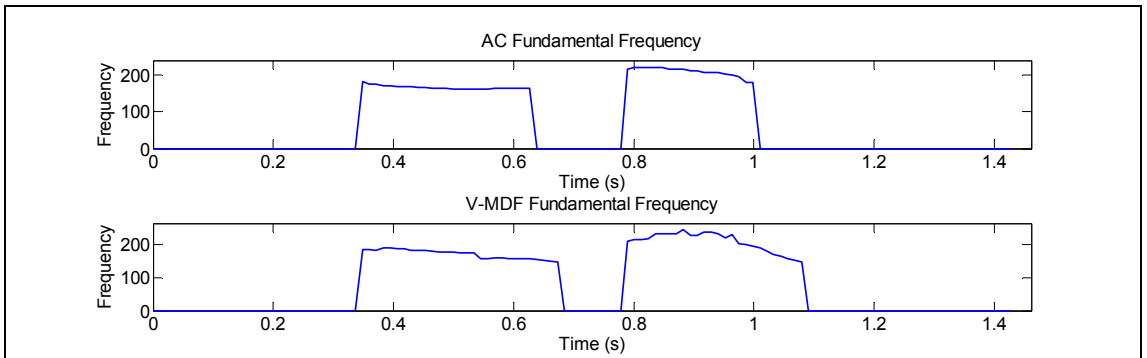


Figure C.62  $F_0$  trajectory of “*tēn/ti*”

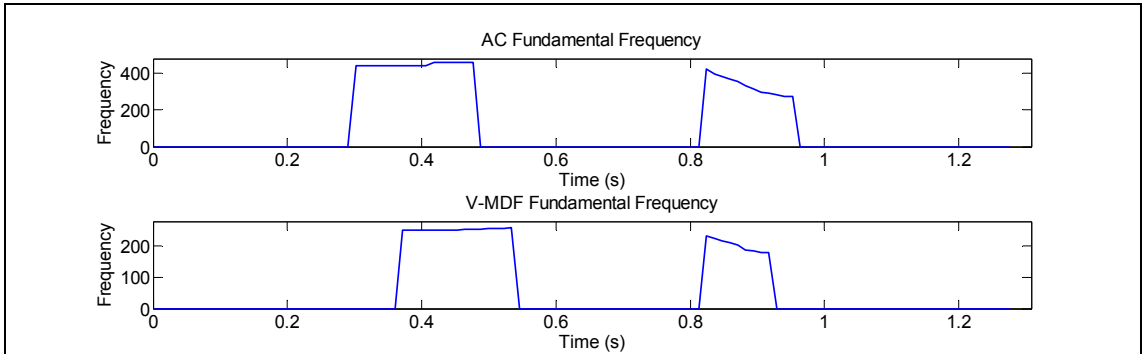


Figure C.63  $F_0$  trajectory of “*māk / s'ut*”

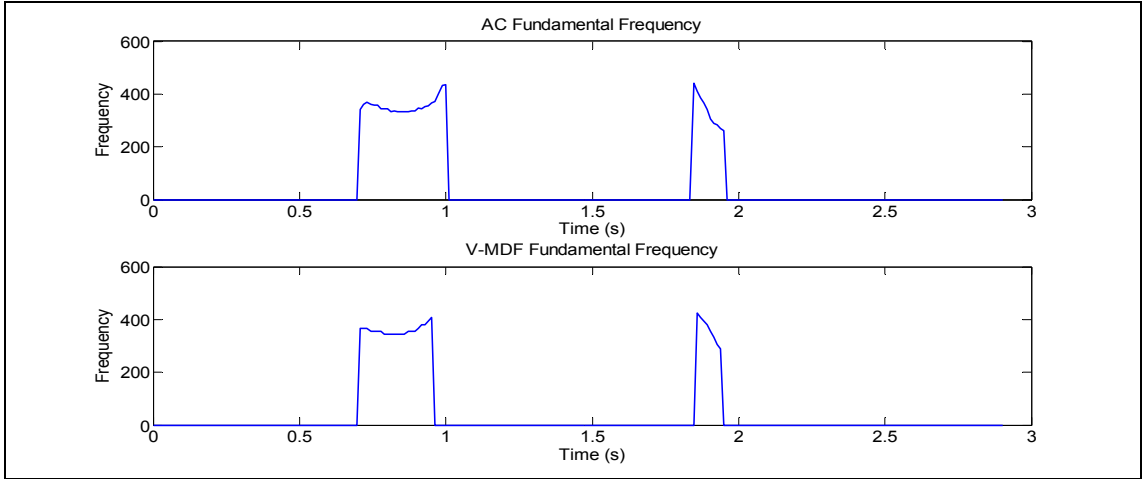


Figure C.64  $F_0$  trajectory of “*nóuy/sùt*”

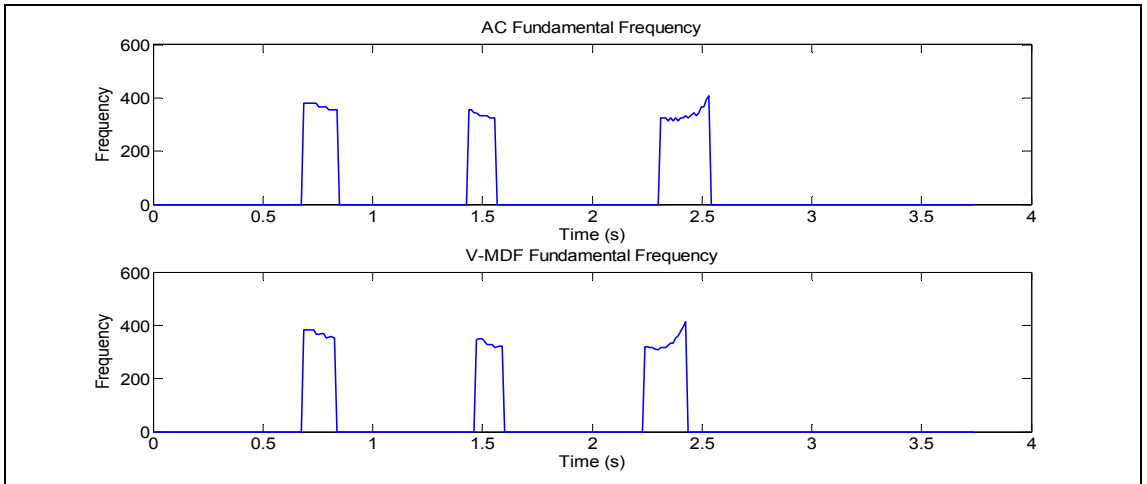


Figure C.65  $F_0$  trajectory of “*rā / dāp / sī aη*”

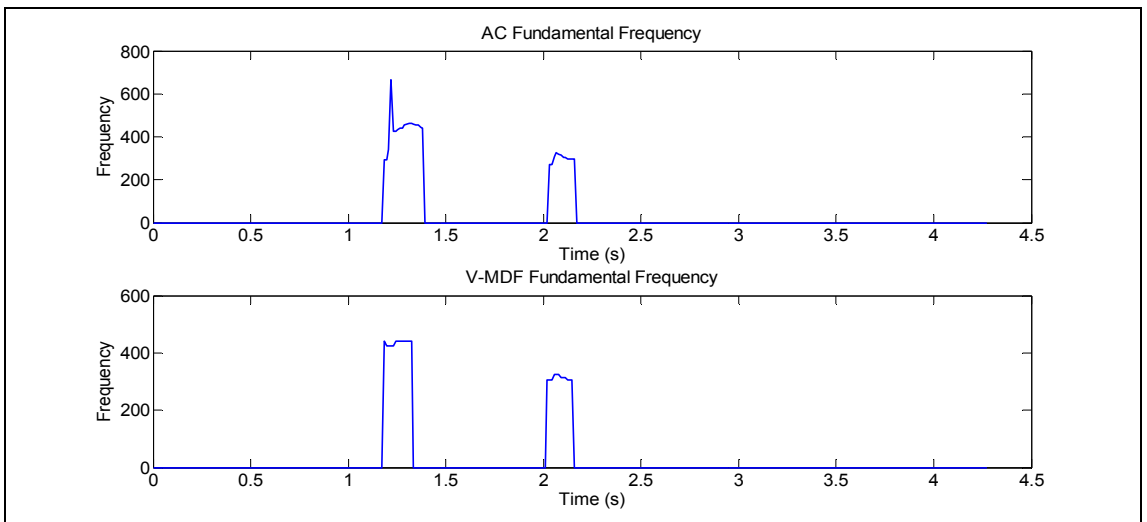


Figure C.66  $F_0$  trajectory of “*rûup/bèεp*”

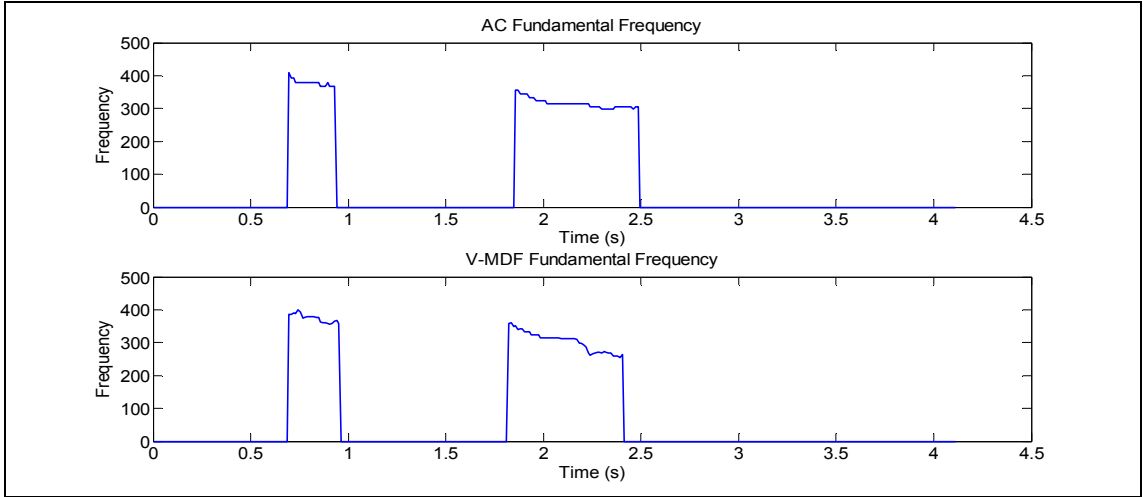


Figure C.67  $F_0$  trajectory of “*rāay/kāan*”

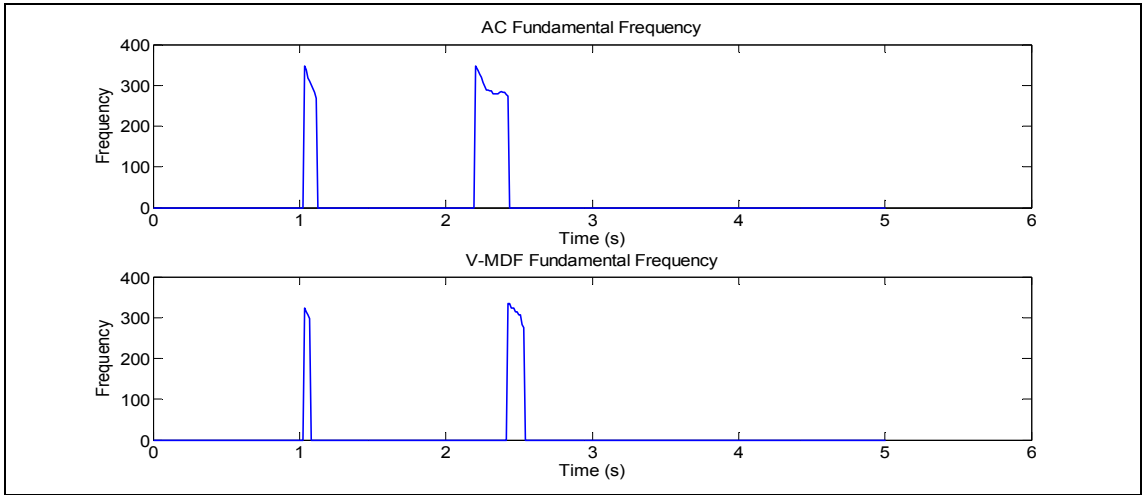


Figure C.68  $F_0$  trajectory of “*sāt / s'uan*”

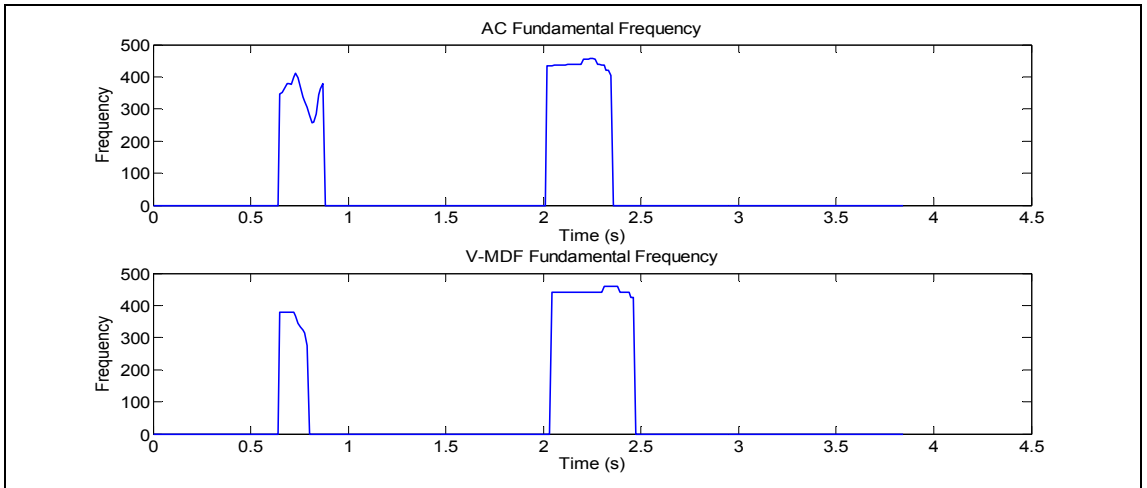


Figure C.69  $F_0$  trajectory of “*hy'ut / phāp*”

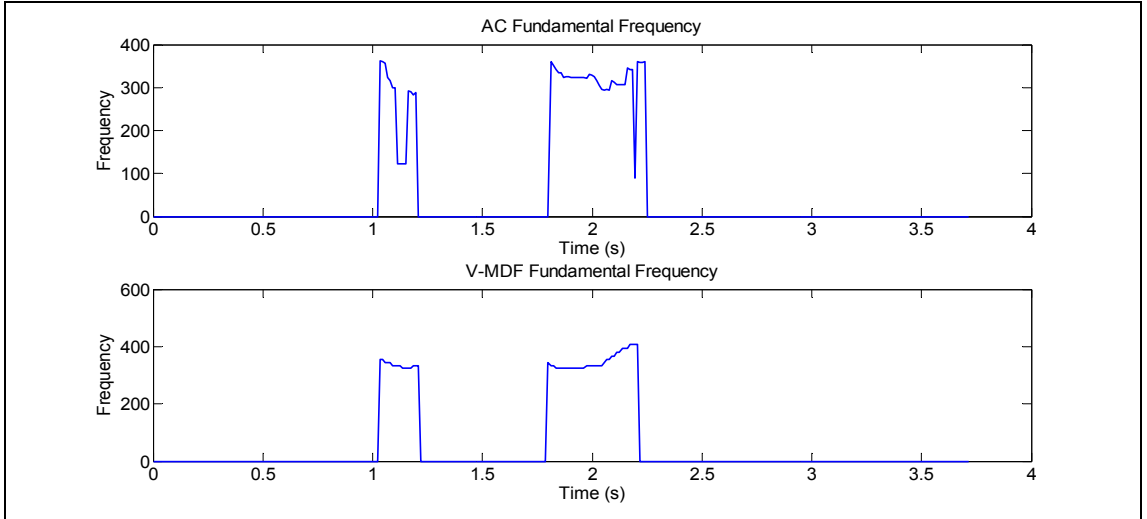


Figure C.70  $F_0$  trajectory of “*tām / sa'm*”

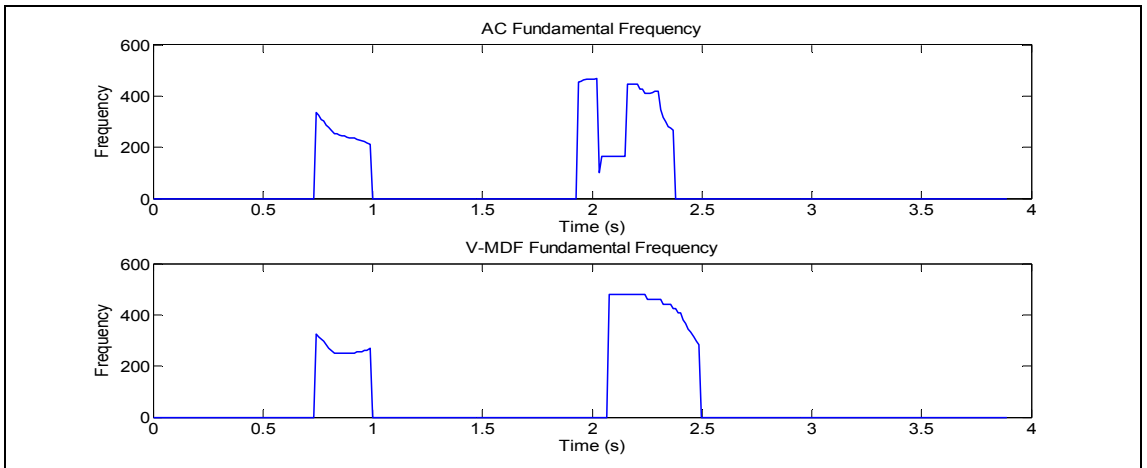


Figure C.71  $F_0$  trajectory of “*phēen / t̃i*”

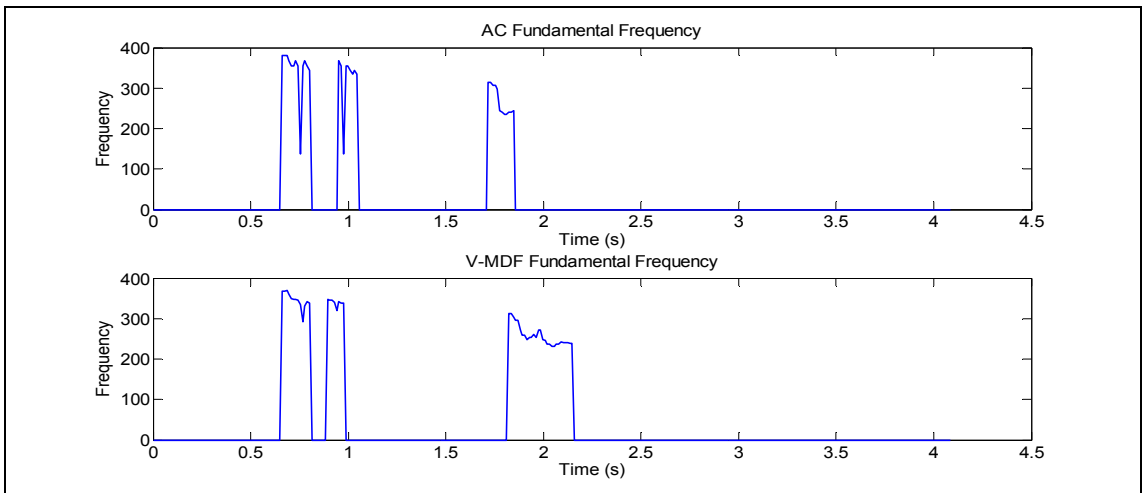


Figure C.72  $F_0$  trajectory of “*cīi / phīi / ɔ̃ēt*”

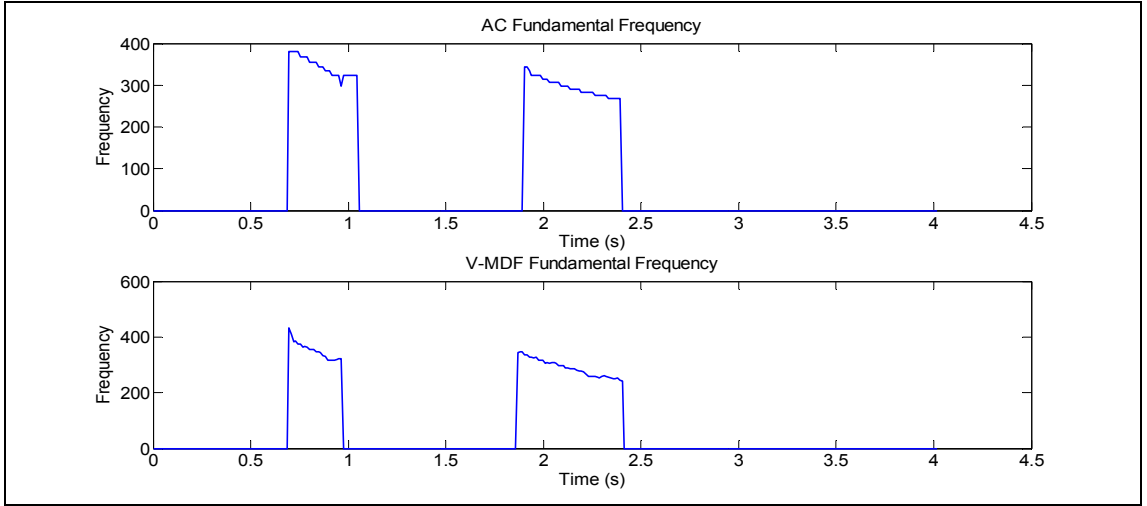


Figure C.73  $F_0$  trajectory of ‘*plāay/thāan*’

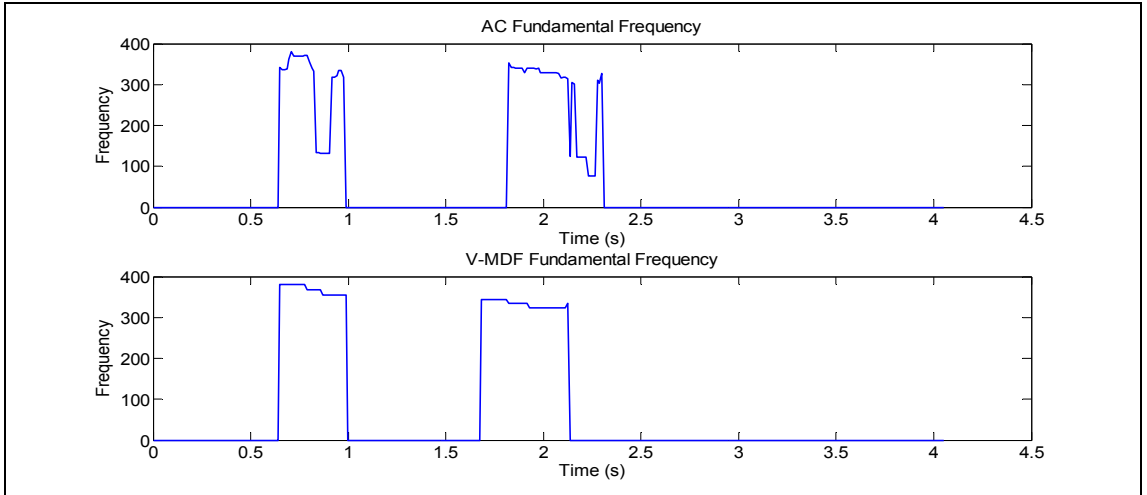


Figure C.74  $F_0$  trajectory of “*nām / thāa η*”

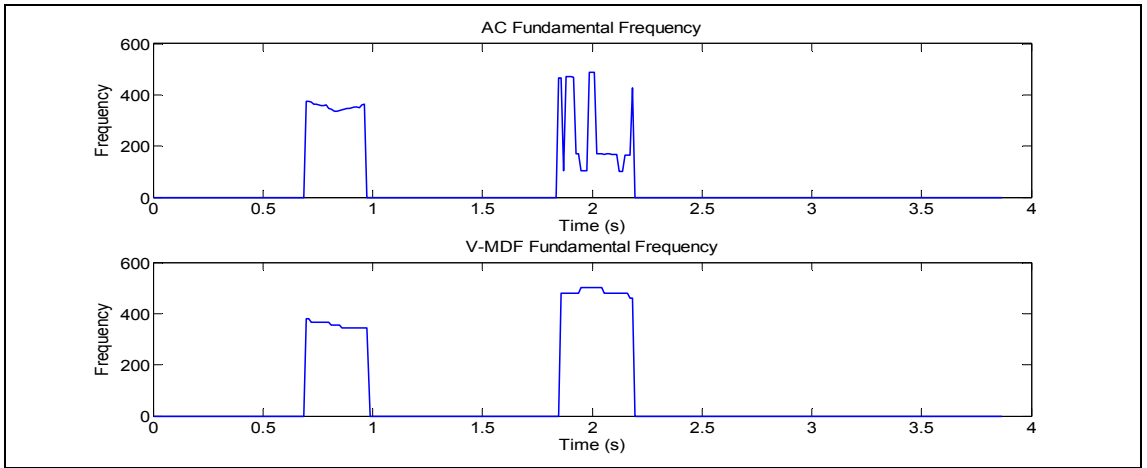


Figure C.75  $F_0$  trajectory of “*pāy / tîi*”

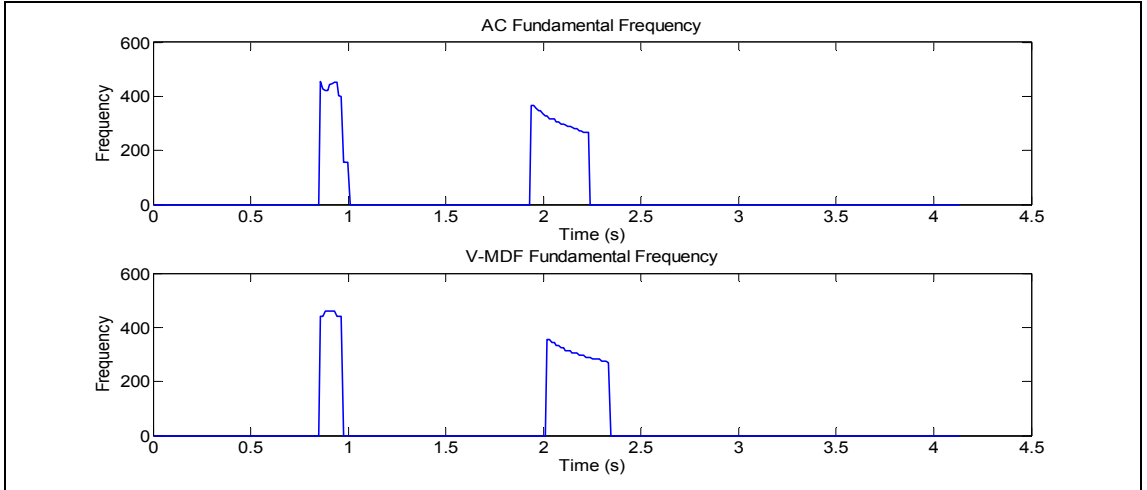


Figure C.76  $F_0$  trajectory of “*sêen/thāaη*”

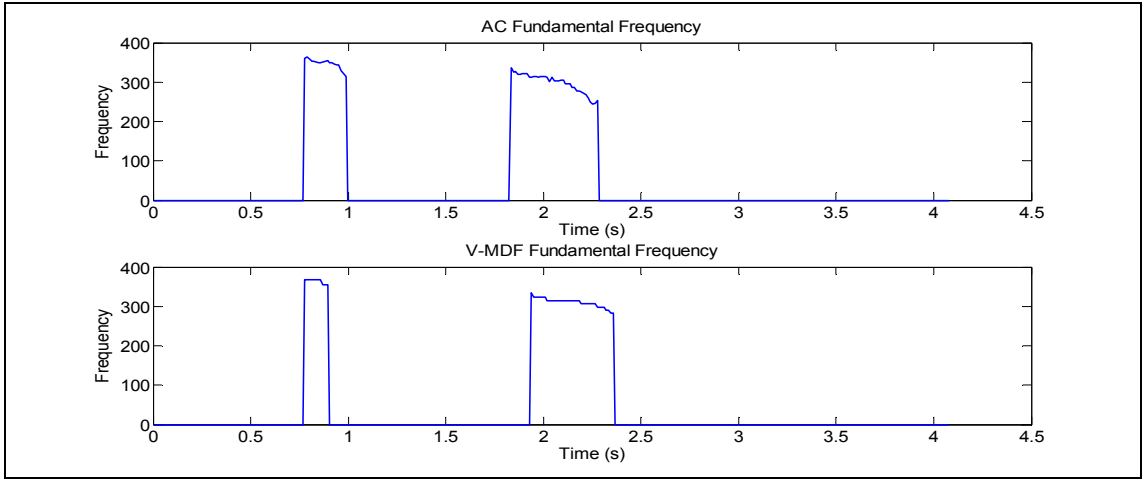


Figure C.77  $F_0$  trajectory of “*rōoη/rēem*”

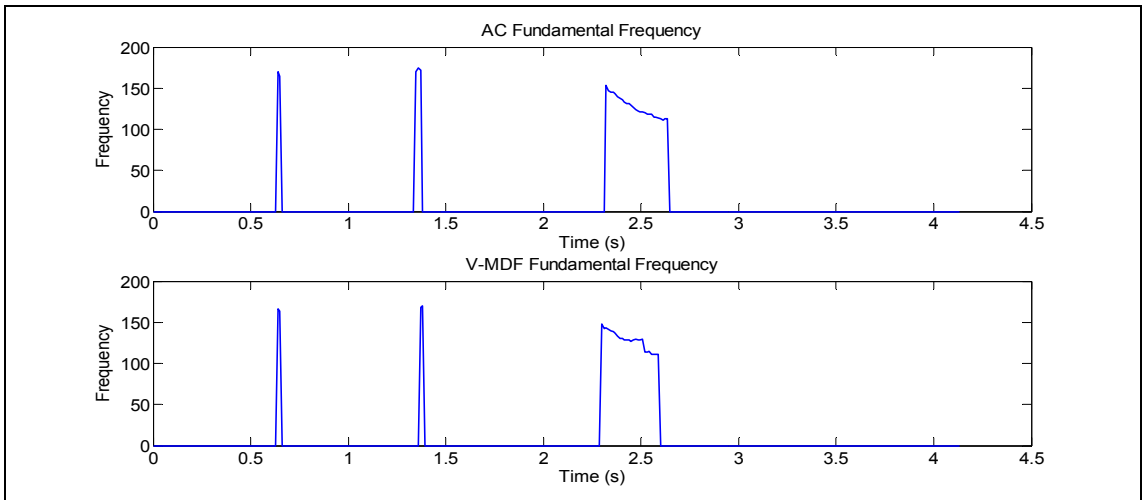


Figure C.78  $F_0$  trajectory of “*cūt / phâk / phòo n*”

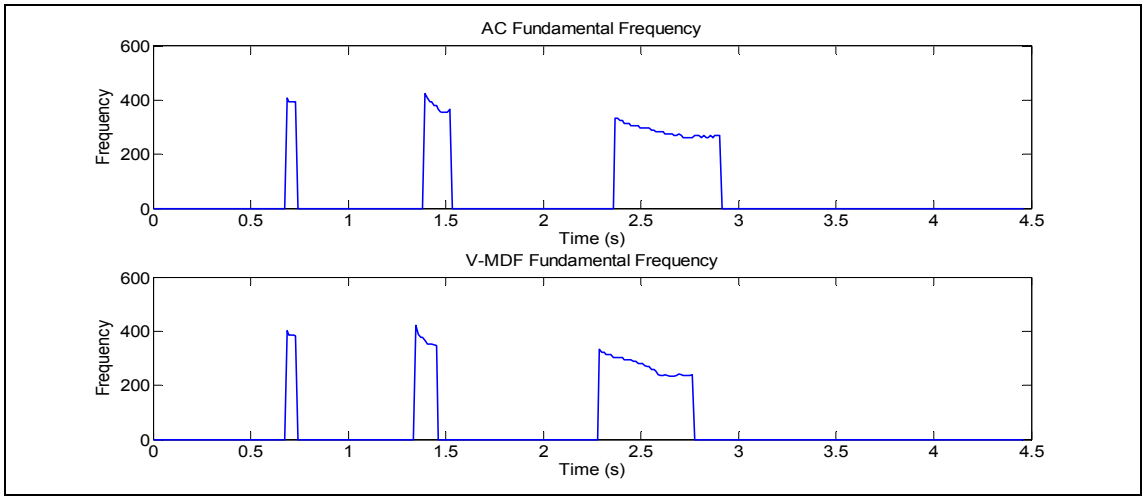


Figure C.79  $F_0$  trajectory of “*phāt / tāa / khāan*”

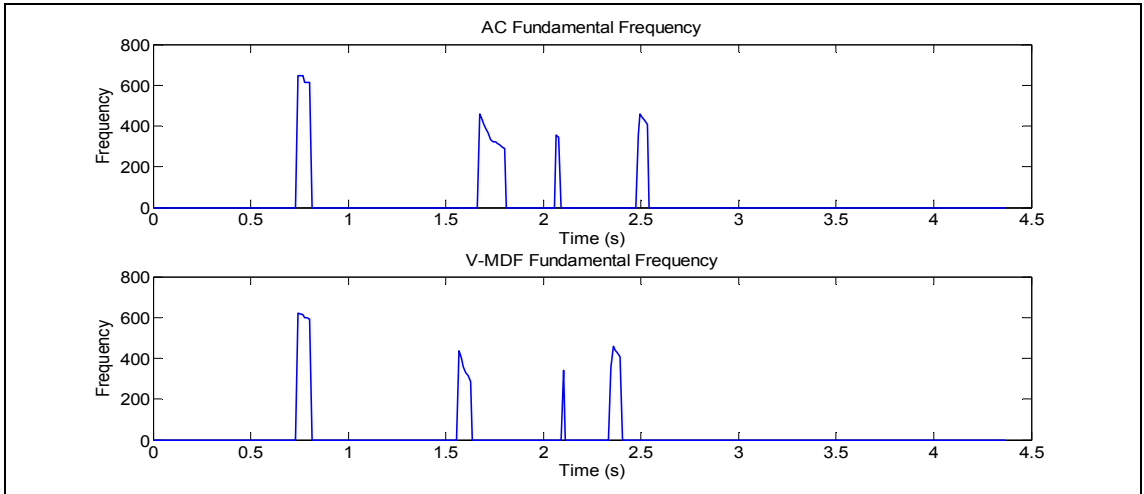


Figure C.80  $F_0$  trajectory of “*khrāan / prāp / āa / kàat*”

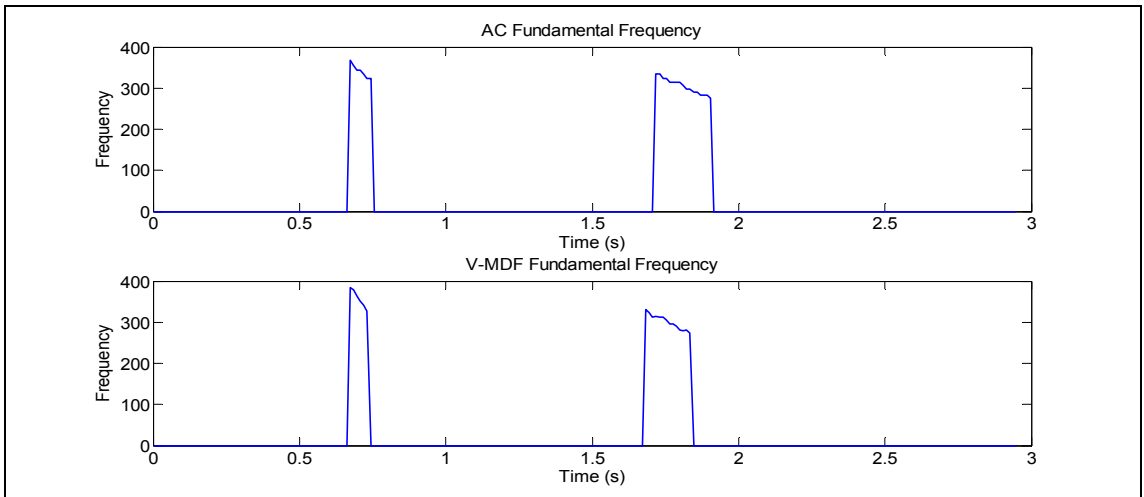
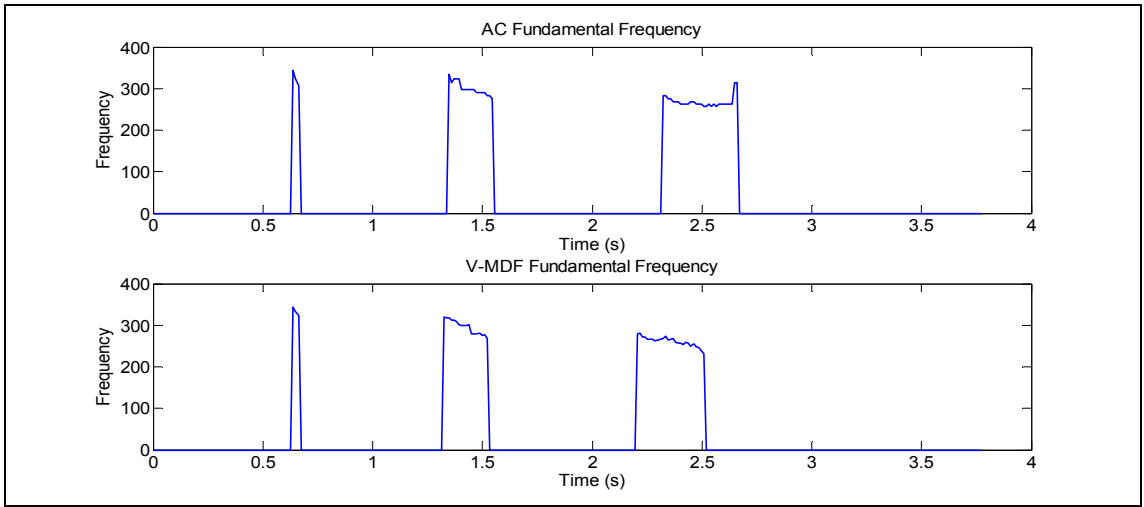
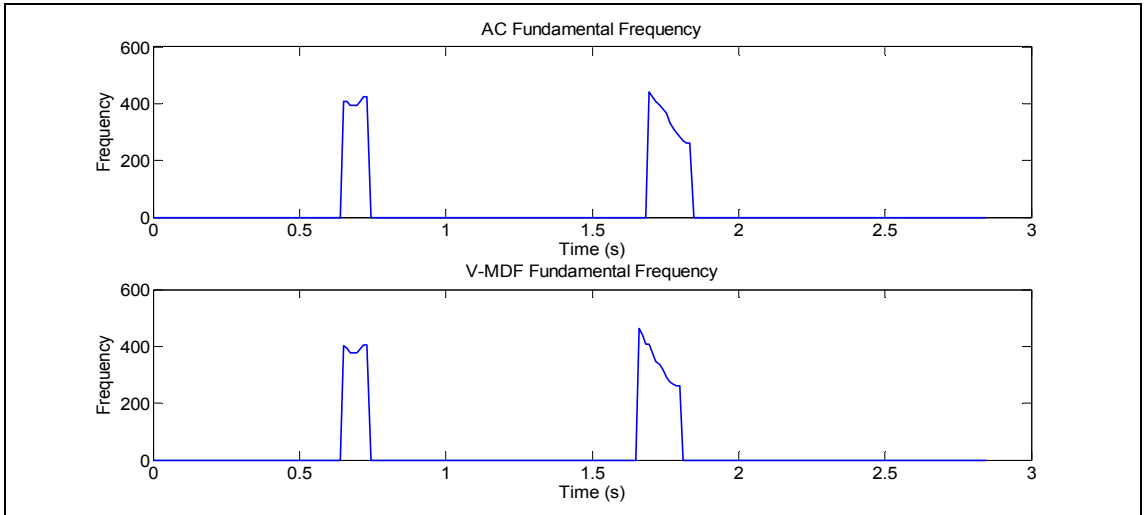


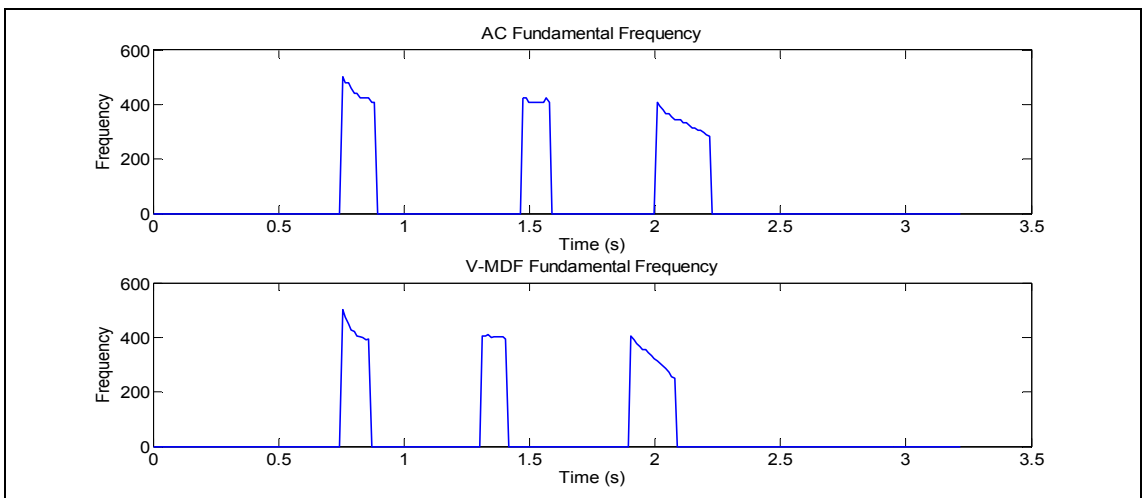
Figure C.81  $F_0$  trajectory of “*c`ut / t`at*”



**Figure C.82**  $F_0$  trajectory of “*cùt/chōm/wīw*”



**Figure C.83**  $F_0$  trajectory of “*rót/tít*”



**Figure C.84**  $F_0$  trajectory of “*thōo/rā/sàp*”

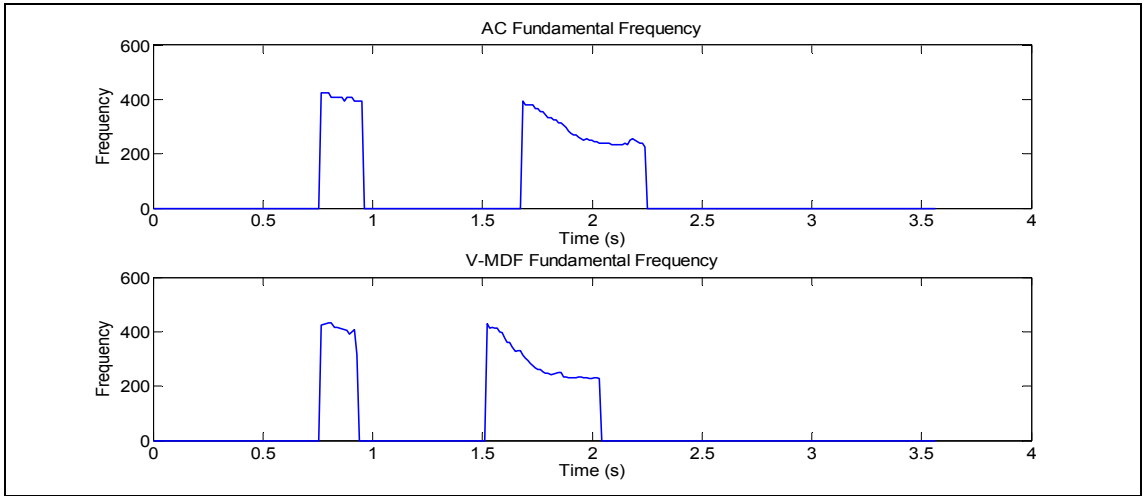


Figure C.85  $F_0$  trajectory of “*thōo/diuan*”

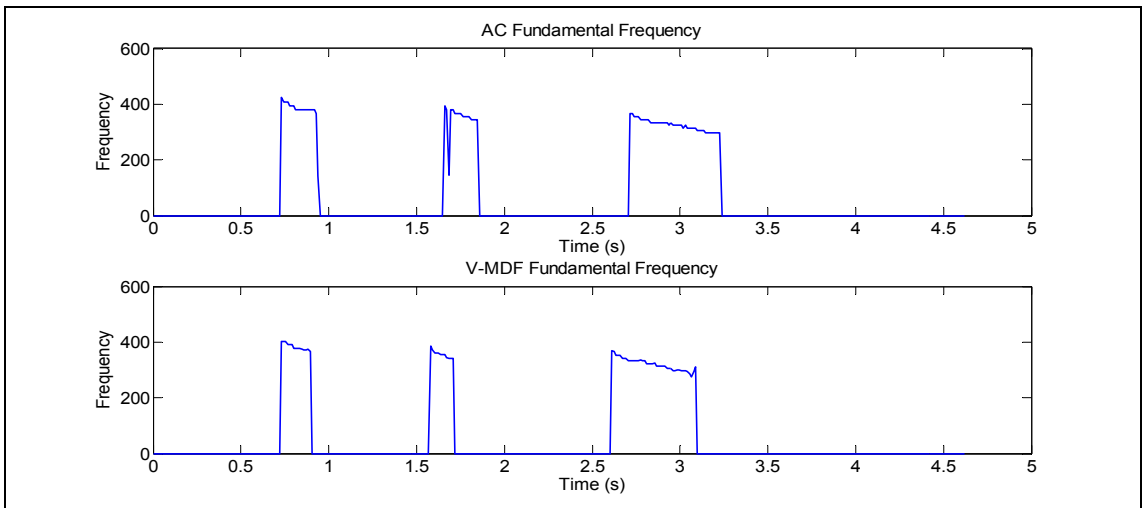


Figure C.86  $F_0$  trajectory of “*rāay/kāan/thōo*”

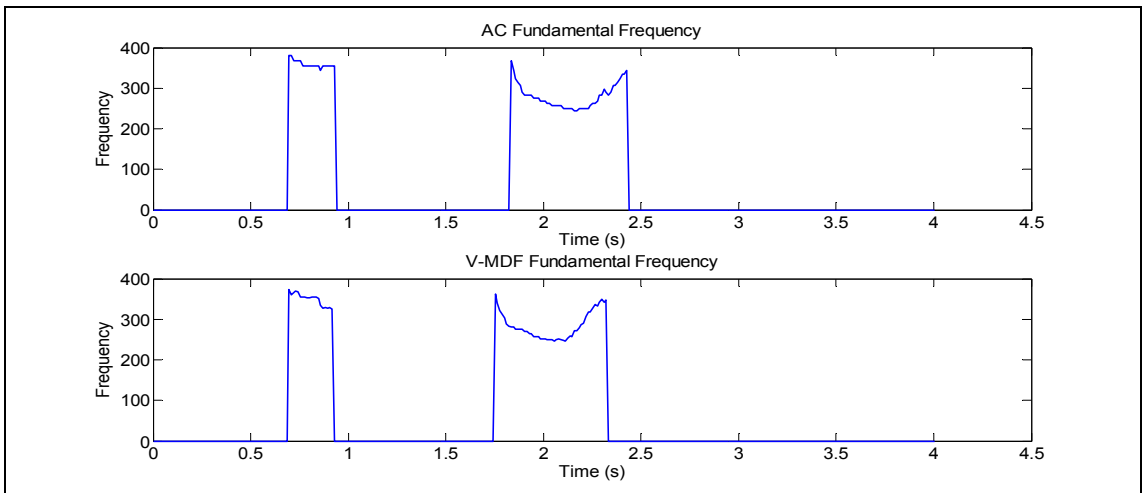


Figure C.87  $F_0$  trajectory of “*wāaη/sāay*”

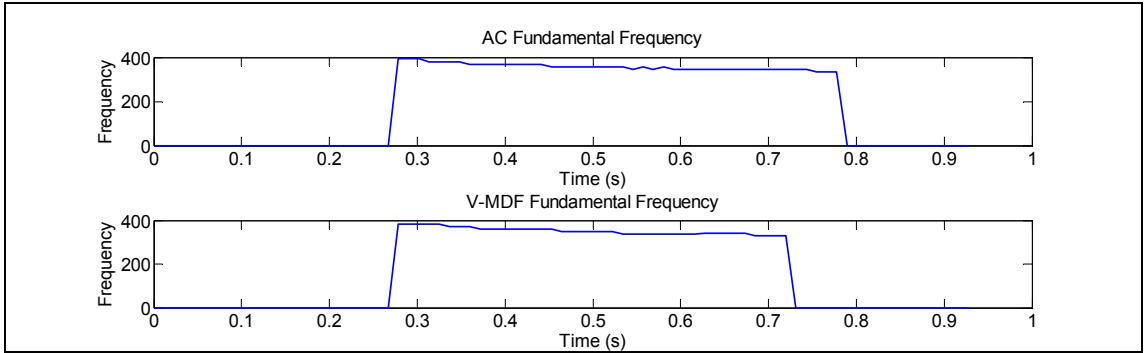


Figure C.88  $F_0$  trajectory of “*thoo*”

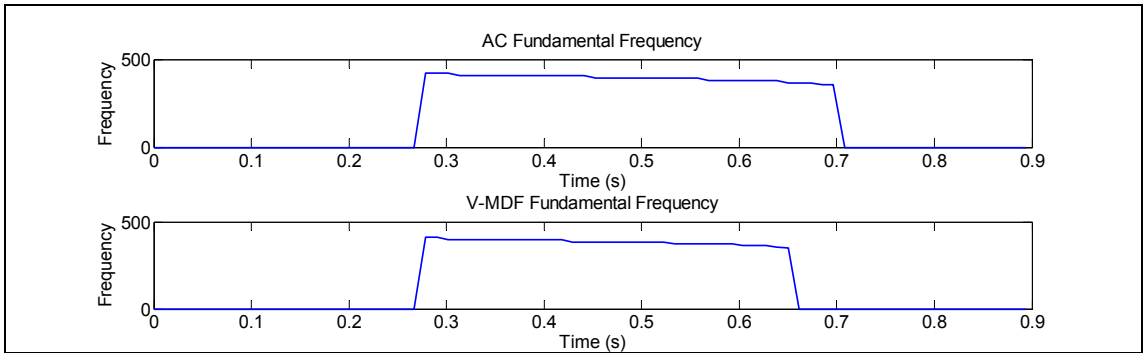


Figure C.89  $F_0$  trajectory of “*srâa η*”

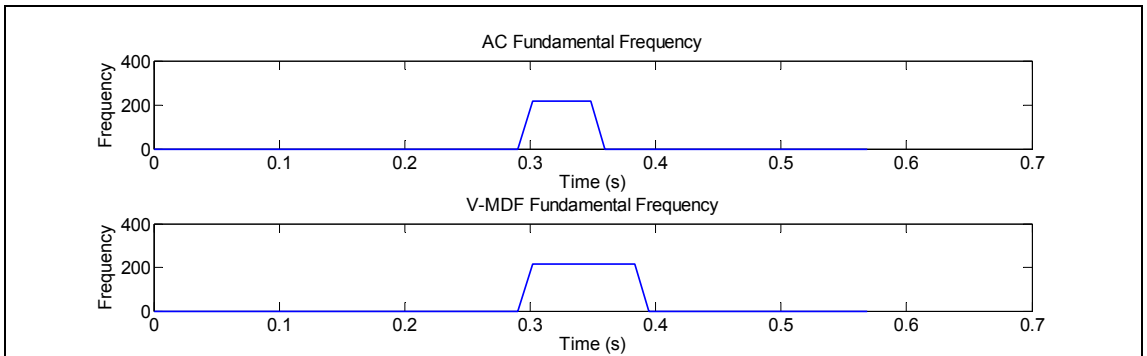
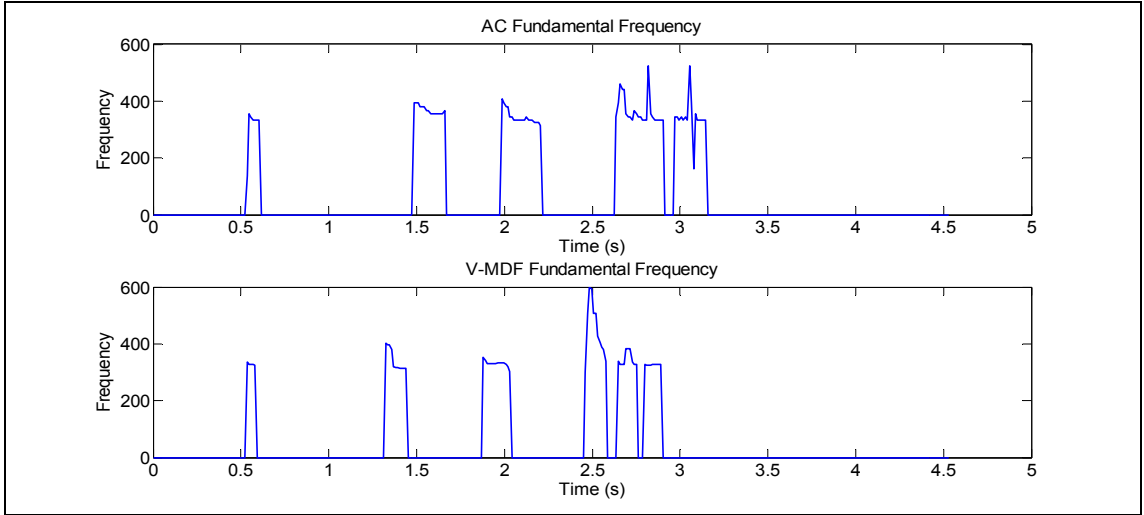
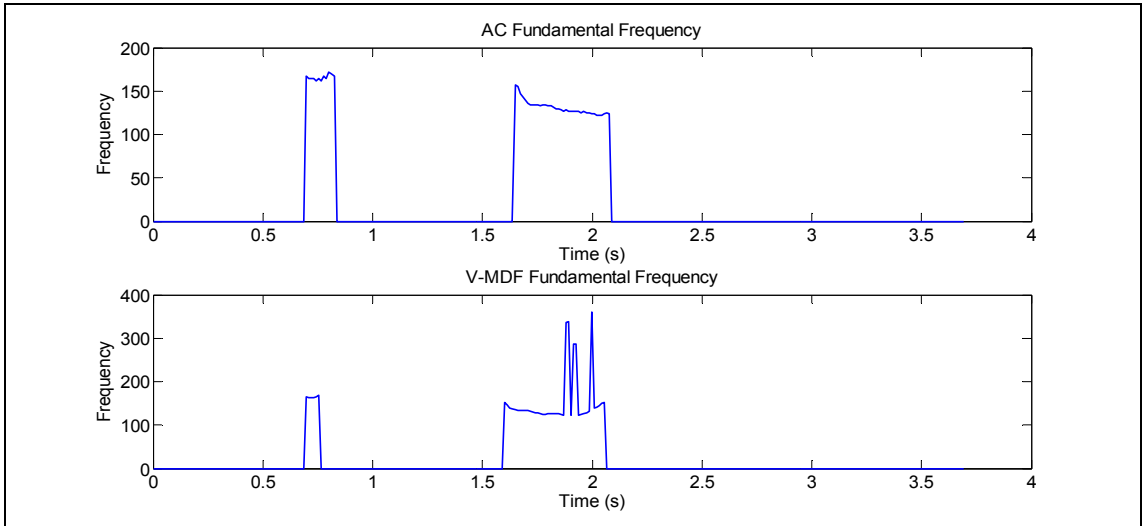


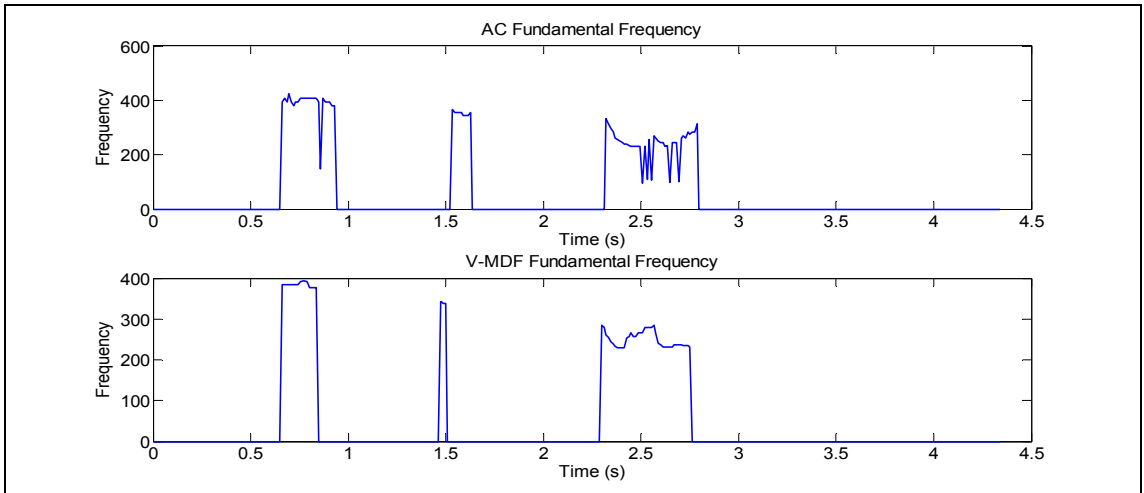
Figure C.90  $F_0$  trajectory of “*pîi*”



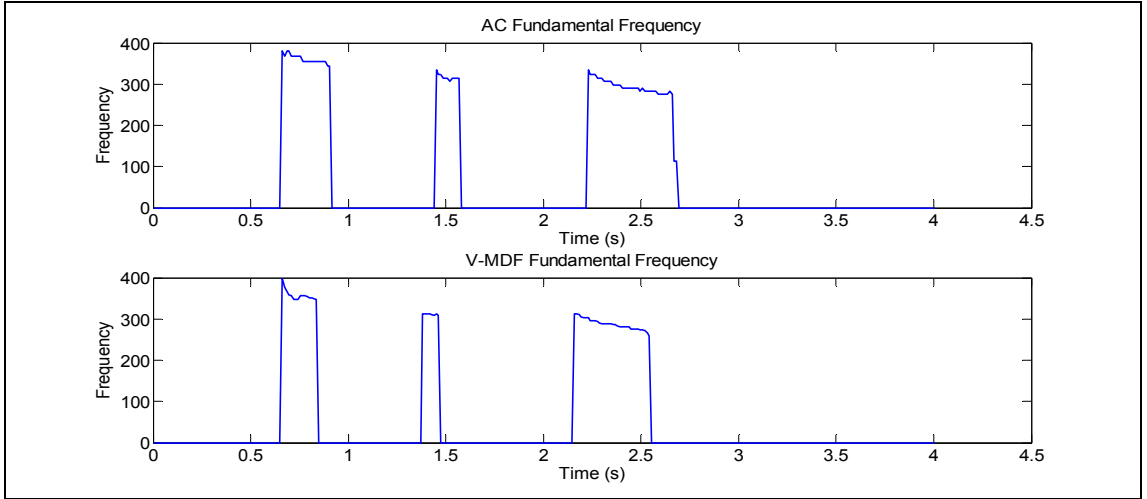
**Figure C.91**  $F_0$  trajectory of “*prā/chūm/tāaṅ/thōo/rā/sàp*”



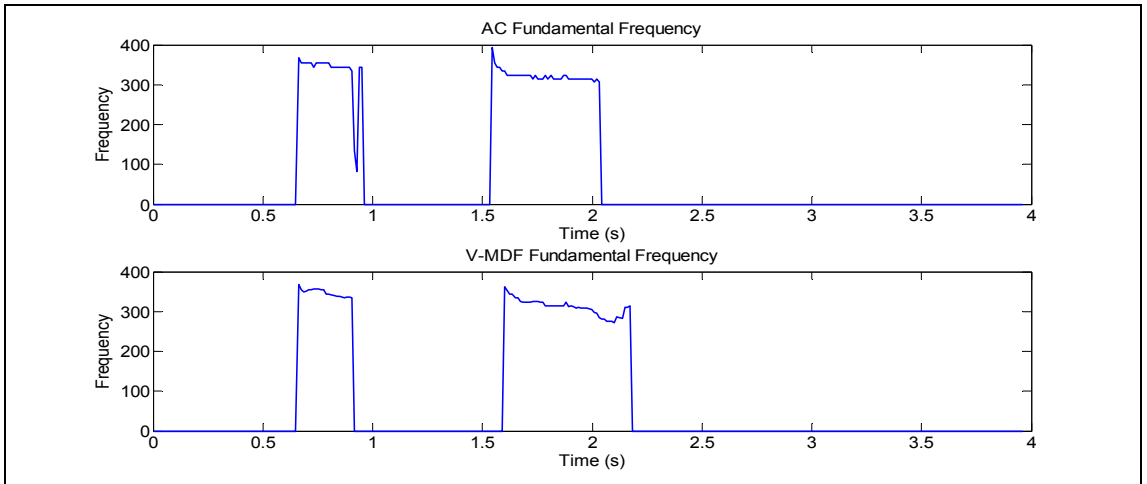
**Figure C.92**  $F_0$  trajectory of “*rāp/sāay*”



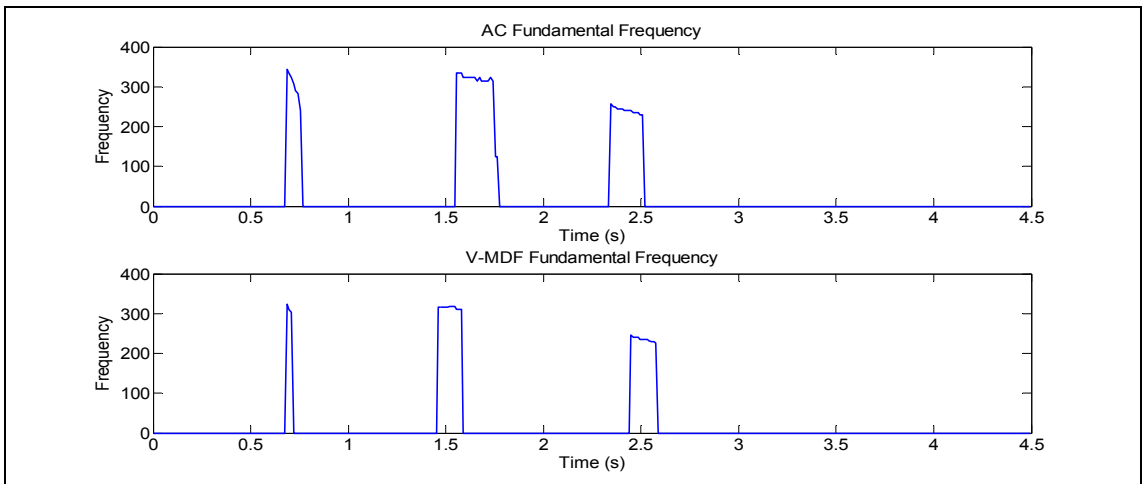
**Figure C.93**  $F_0$  trajectory of “*māy/rāp/sāay*”



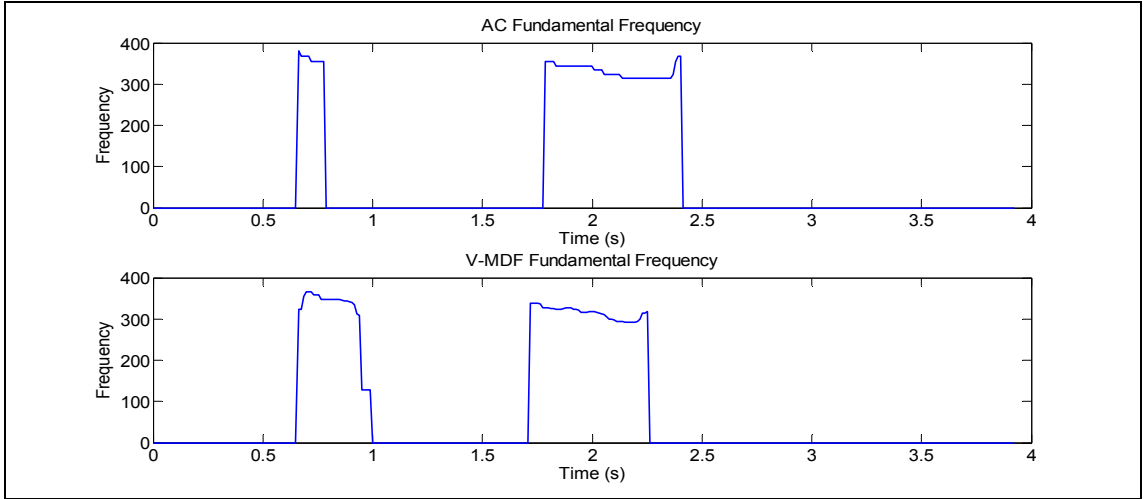
**Figure C.94**  $F_0$  trajectory of “*wēe/lāa/thōo*”



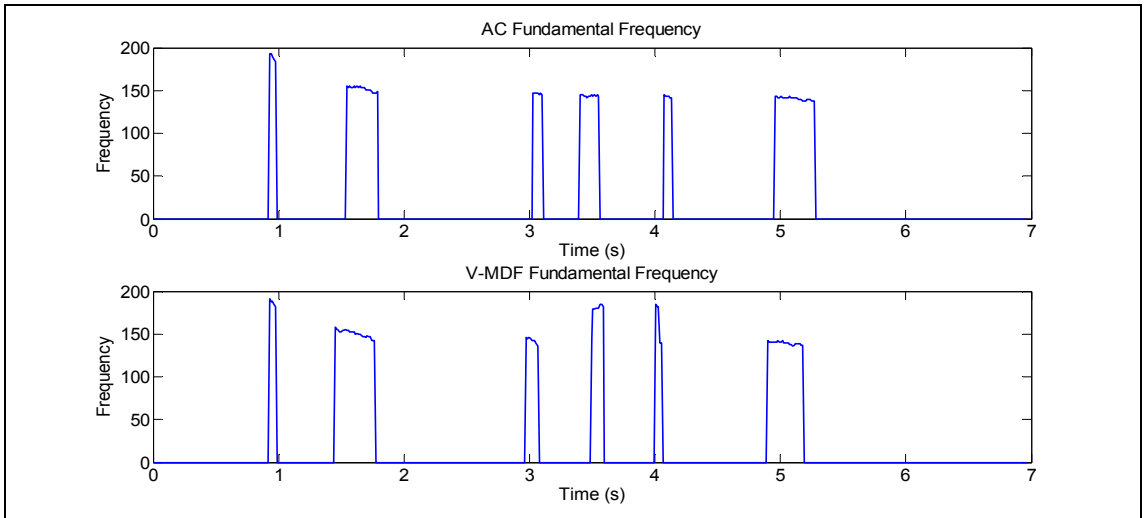
**Figure C.95**  $F_0$  trajectory of “*pāan / klāa η*”



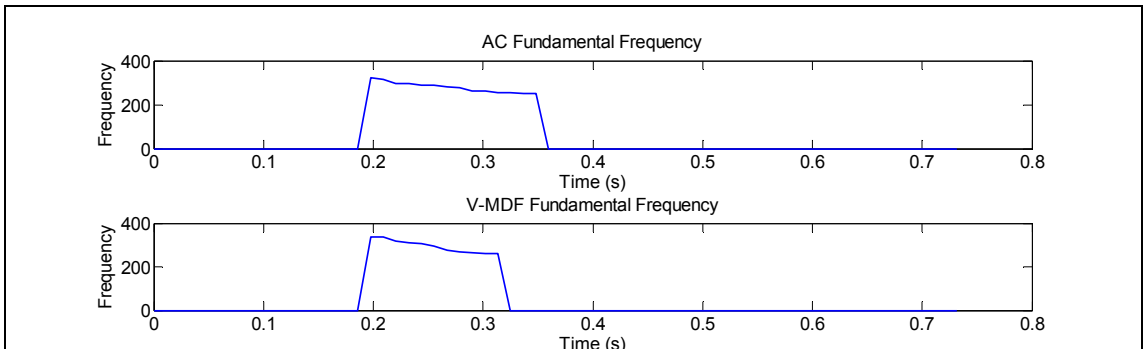
**Figure C.96**  $F_0$  trajectory of “*cùt / rṵy/tṵṵ*”



**Figure C.97**  $F_0$  trajectory of “*nāy/māṅ*”



**Figure C.98**  $F_0$  trajectory of “*khôᵛ/mūun/kāan/cā/rāa/cōᵛn*”



**Figure C.99**  $F_0$  trajectory of “*dūan*”

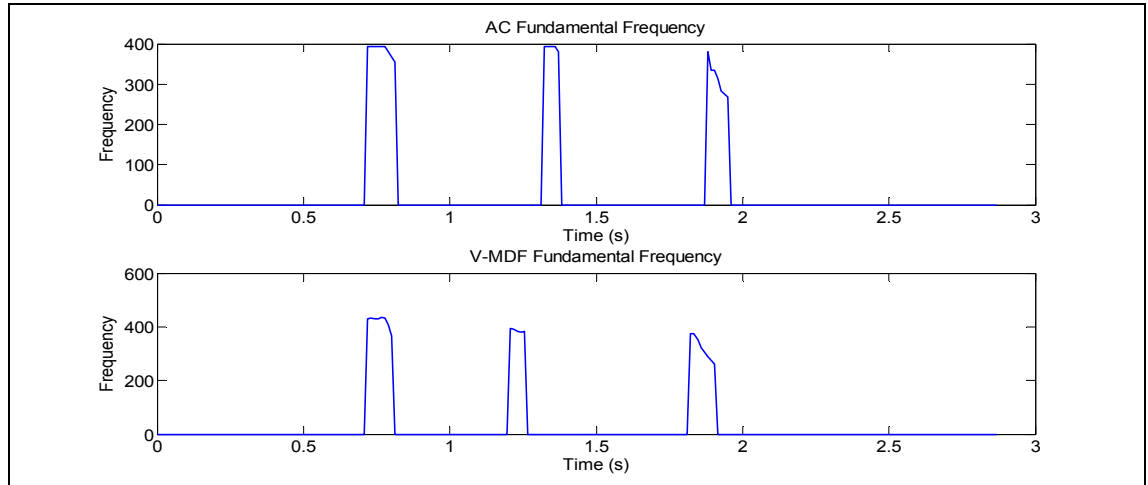


Figure C.100  $F_0$  trajectory of “*tū / rā / kīt*”

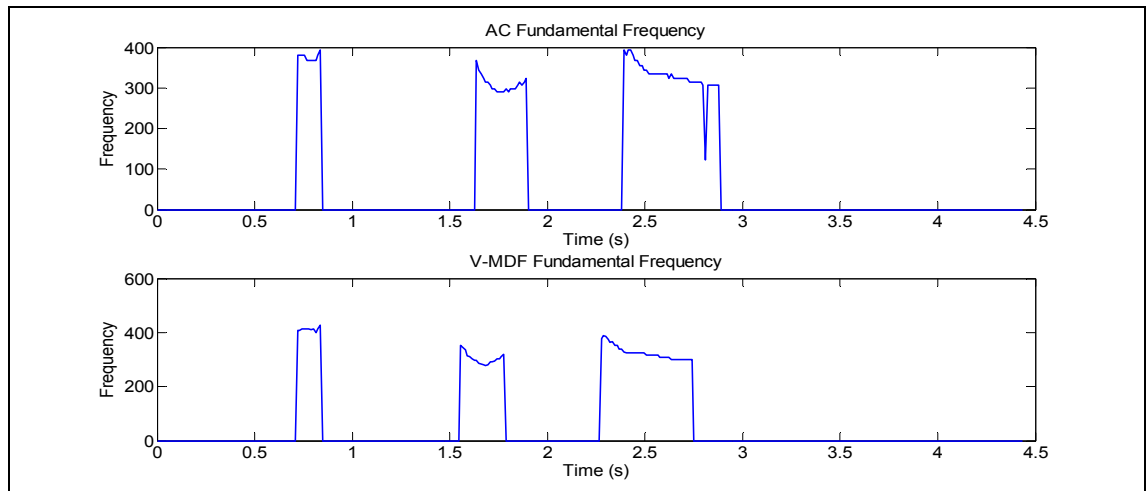


Figure C.101  $F_0$  trajectory of “*thāw / sāy / rōṅ*”

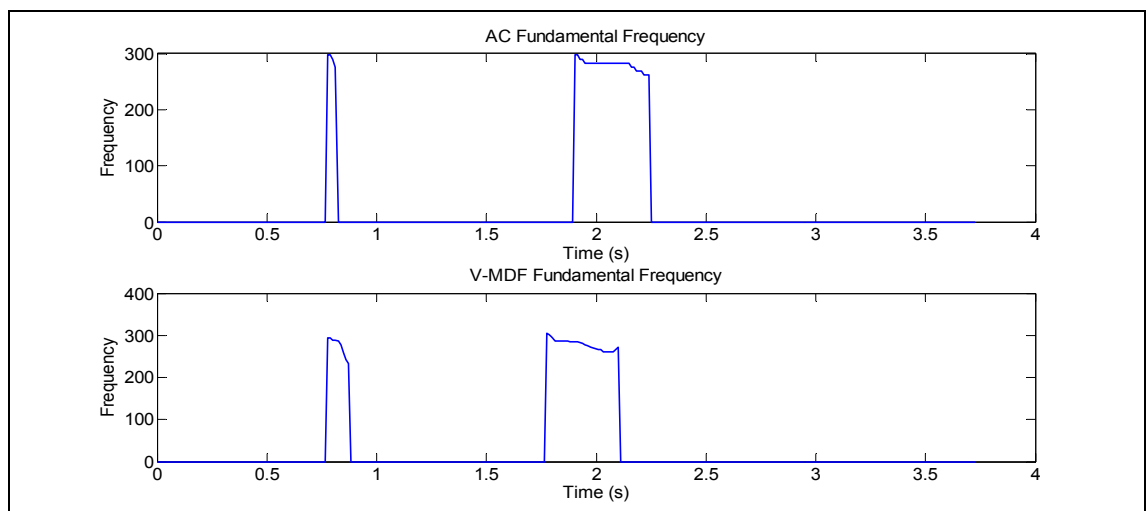
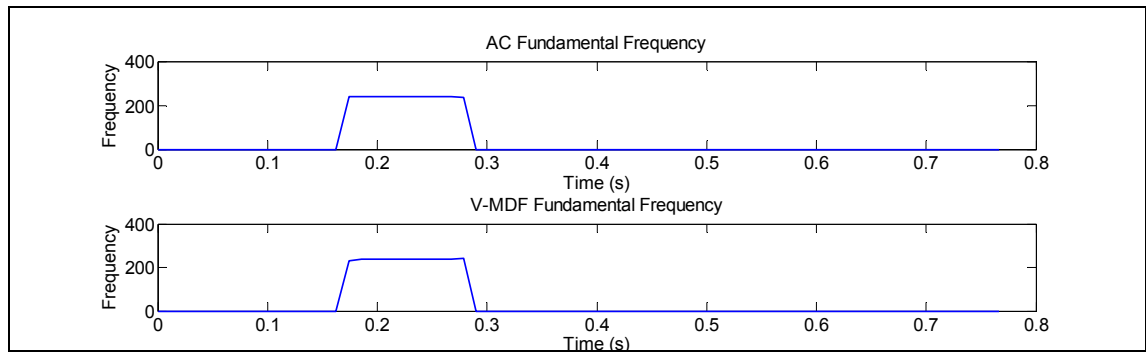
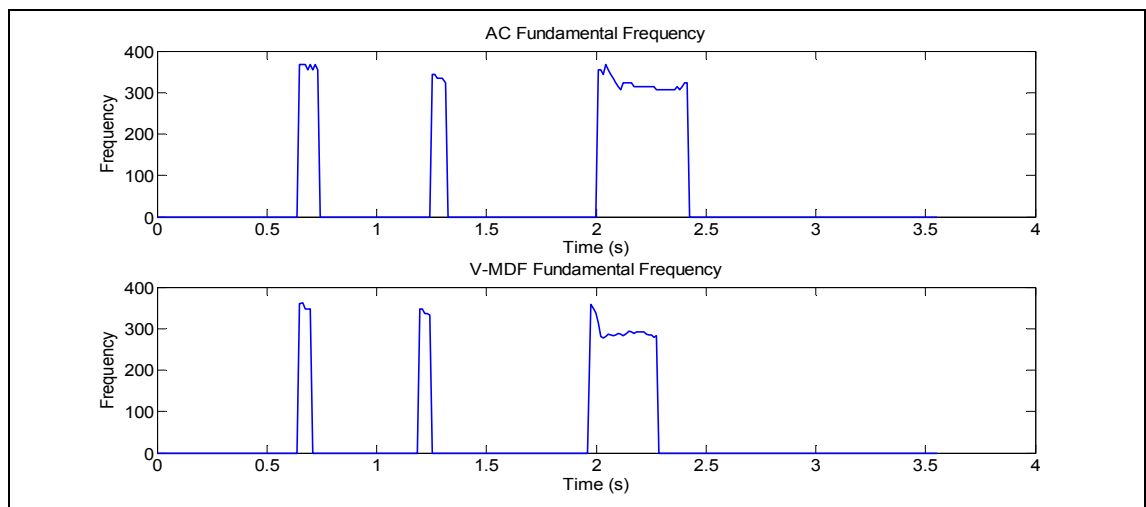


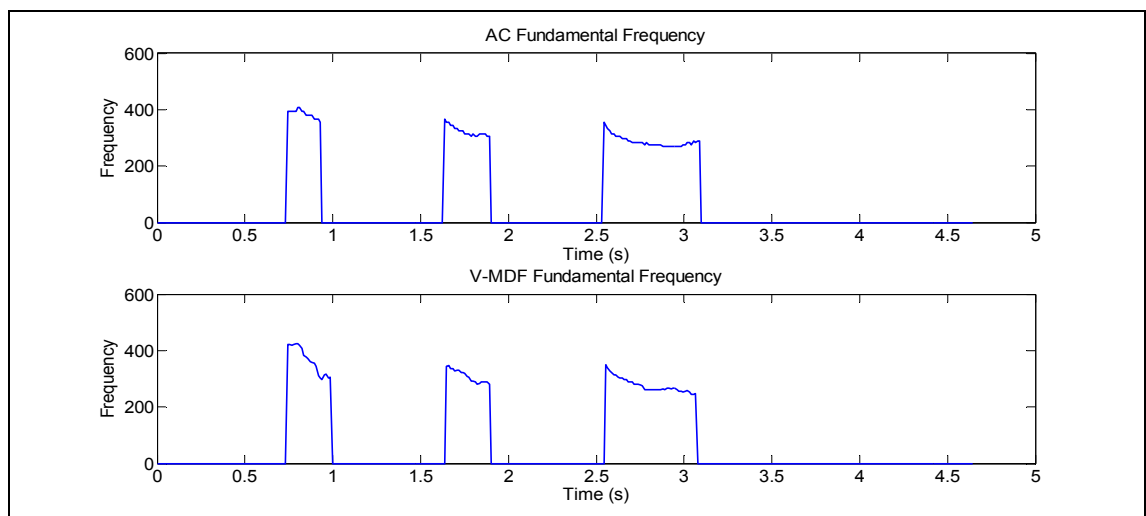
Figure C.102  $F_0$  trajectory of “*sūan / tūaw*”



**Figure C.103**  $F_0$  trajectory of “*dhan*”



**Figure C.104**  $F_0$  trajectory of “*pa/ti/thin*”



**Figure C.105**  $F_0$  trajectory of “*than/kham/cam*”

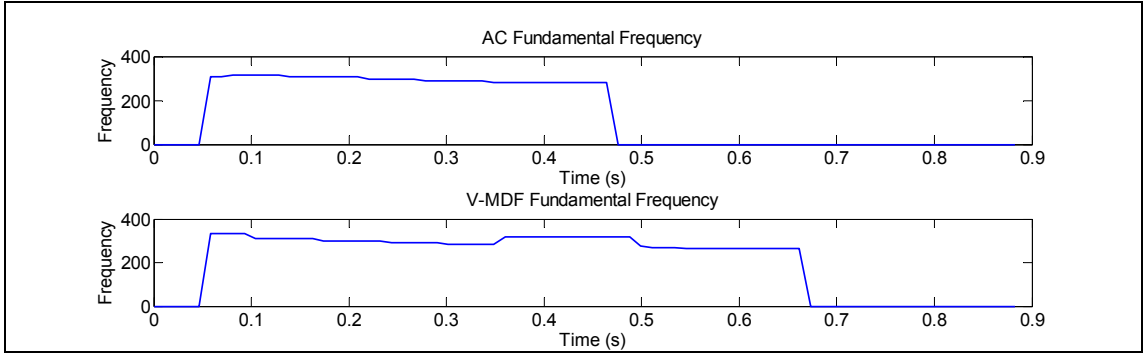


Figure C.106  $F_0$  trajectory of “*ηāan*”

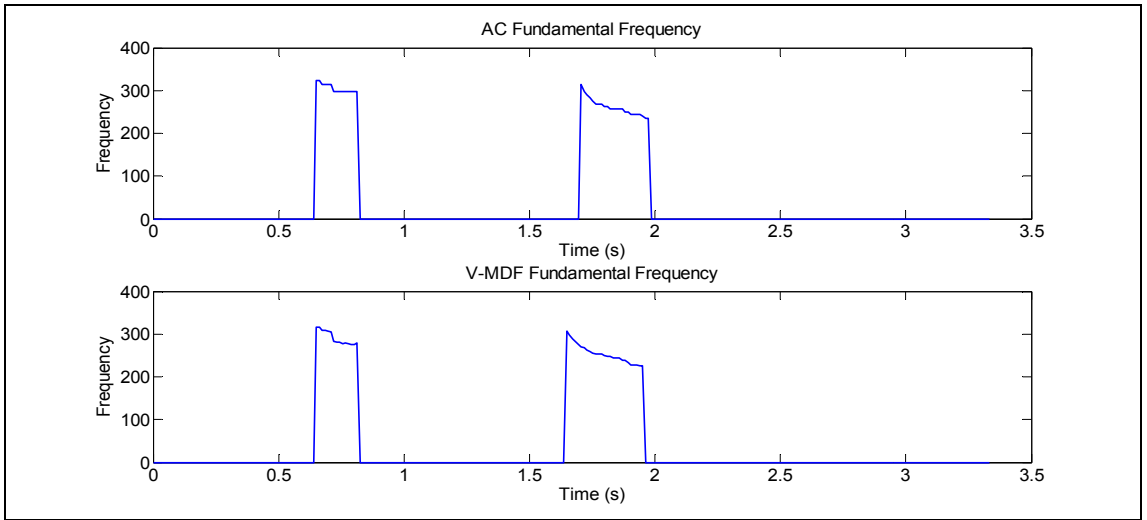


Figure C.107  $F_0$  trajectory of “*wān/kəət*”

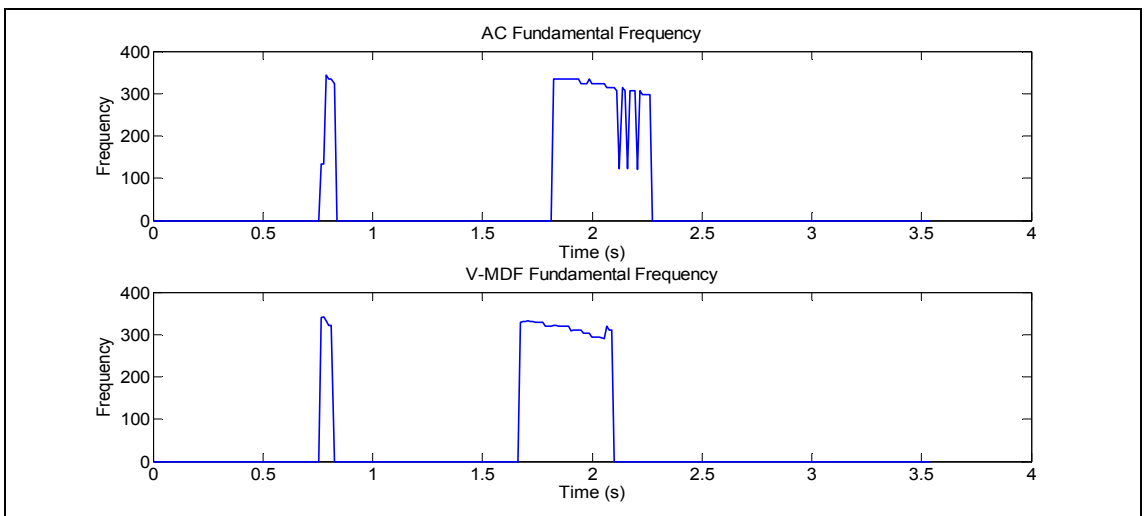


Figure C.108  $F_0$  trajectory of “*sāp/dāa*”

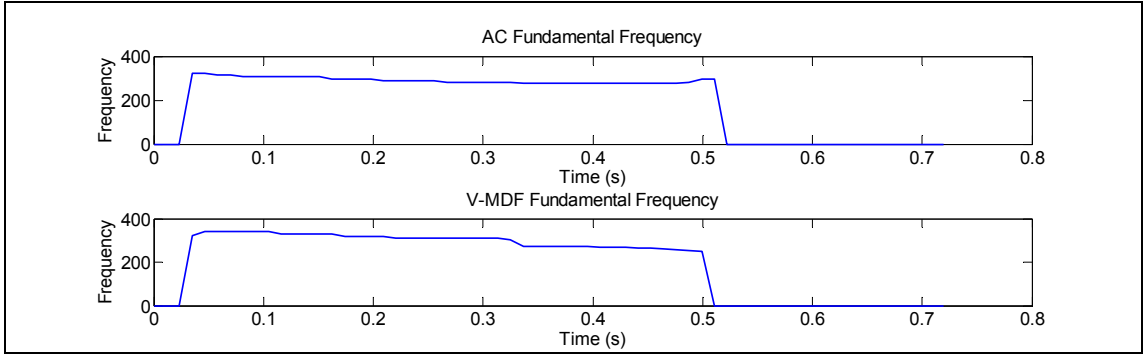


Figure C.109  $F_0$  trajectory of “*gēm*”

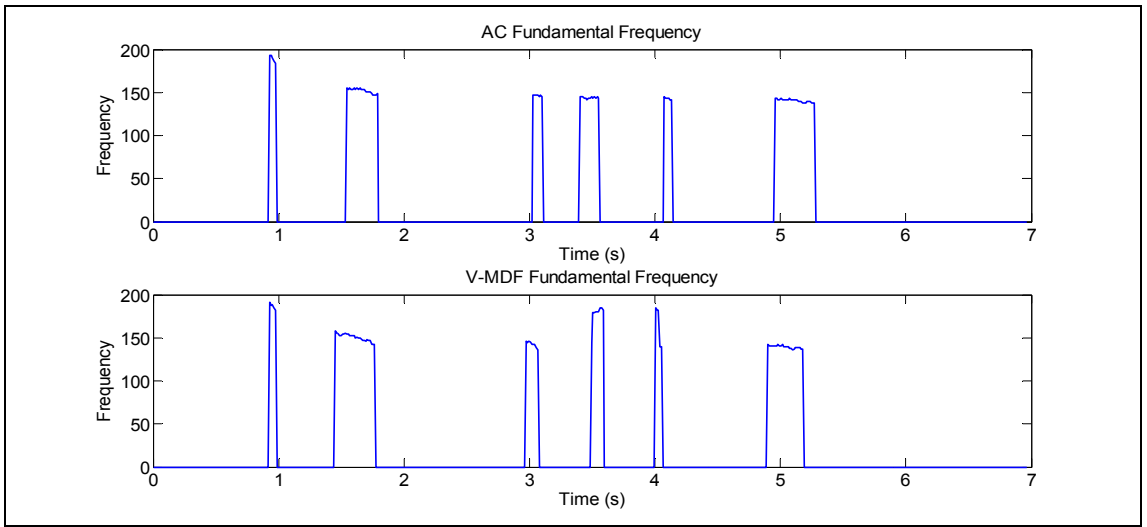


Figure C.110  $F_0$  trajectory of “*sā/mùt/thōo/sàp*”